

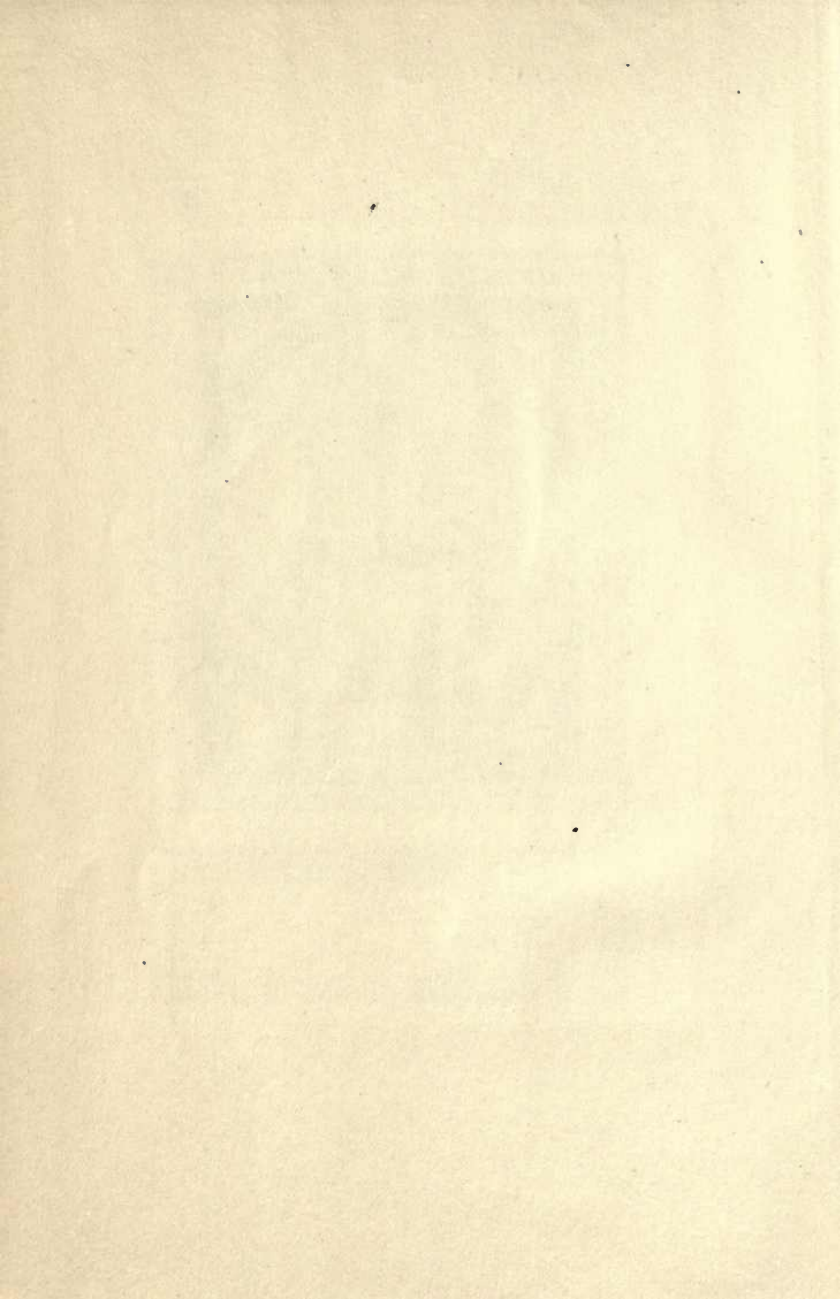
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ELEMENTARY FLORA
OF THE NORTHWEST

FRYE AND RIGG

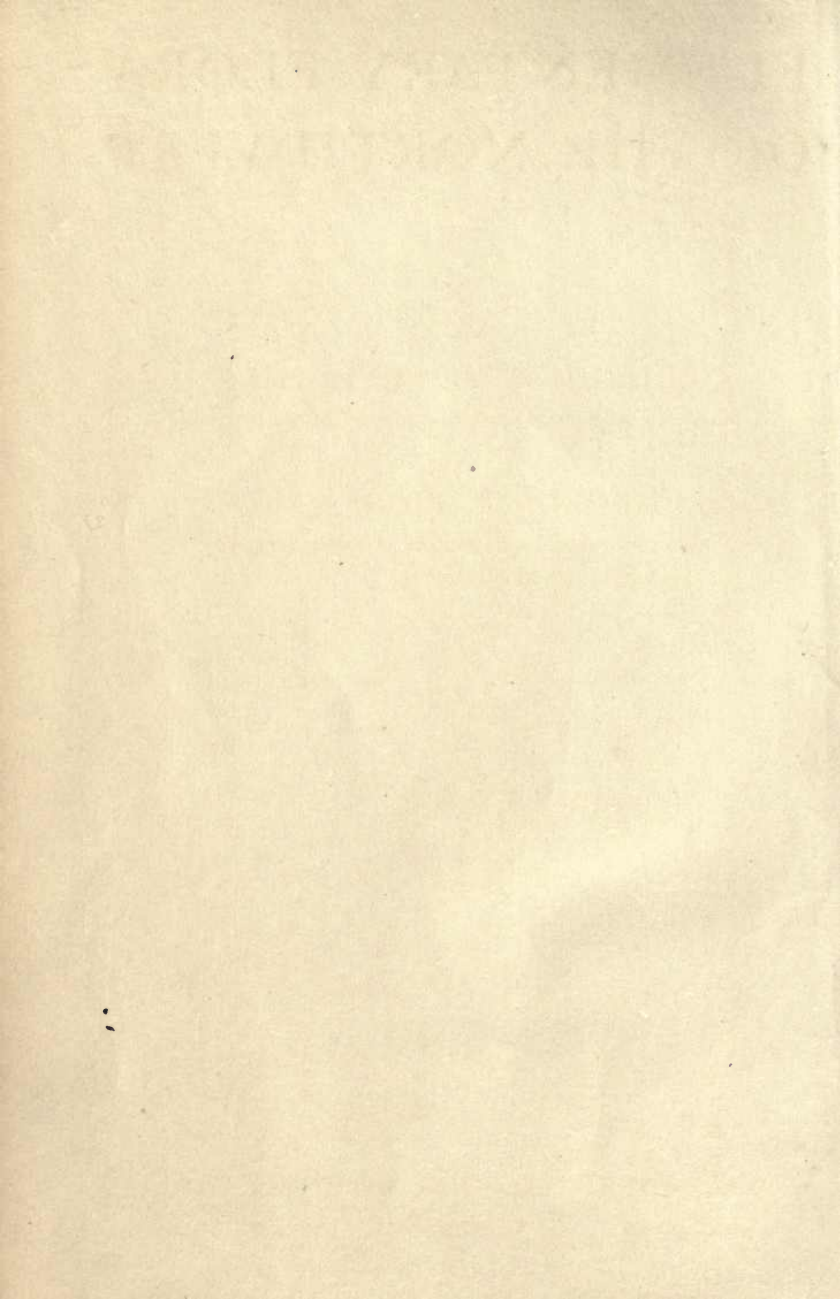


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ELEMENTARY FLORA OF THE NORTHWEST

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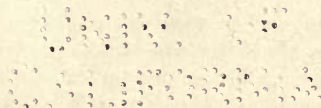
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NEW YORK

INTRODUCTION

THIS book was written primarily on account of the great need for some such work in the schools of the Northwest. Geographically it covers Oregon, Idaho, Washington, and the coastal region of southwestern British Columbia.

The usual limited spring flora omits so many plants that the user must know beforehand the name of the particular plant whose name he is seeking, in order that he may find by the index whether the book includes or omits it. This is absurd. Usually there is a species description, whose necessary brevity often makes it do equally well for a number of species not included.

In this book the keys are complete so far as they go, except in a very few genera of grasses, in which the limits are expressly stated. This will enable teachers to hand out for analysis plants they do not themselves know. This is specially desirable in the Northwest, where teachers may move to other schools only a hundred miles away and find a tremendous change in the flora. It is unreasonable in the Northwest to expect teachers of botany to know all the local plants, even though they may have specialized in the subject in an undergraduate course.

The distinguishing characteristics of a plant are mostly given in the keys. Species descriptions are little more than a repetition of these, together with a number of others too general to distinguish anything definitely. It is a waste of space to repeat so often in species descriptions, while omitting so much that is wanted in the keys in an elementary flora, since small cost, and therefore small size, is one of the primary requisites.

The persistent and regrettable tendency of taxonomic botanists to elevate varieties to specific rank has resulted in the separation of the species of many genera on such minute or trifling characteristics that in the opinion of the writers it is not advisable in many cases for the beginner to go beyond the genus.

Many of the common cultivated crop plants, the bad weeds, and the medicinal plants are indicated by a few words.

The derivation of the generic name is given after the genus description. This often helps to associate the name with some characteristic of the plants.

In the common names there is much confusion and duplication. We have herein given one common name for each species in so far as such are known to us, choosing the one most common or most applicable when there were several.

To illustrate the use of the keys let us take the common large-leaved maple. Beginning on page (7) with the KEY TO FAMILIES, compare A with AA; evidently this maple falls under AA. Compare the next letter (C) under AA with its double (CC); this maple goes to CC, which refers to the KEY TO THE DICOTYLEDONS on page (10). There compare A with AA, to find it goes to A; then the first letter (B) under A with its double (BB), tracing it to B, which refers to Group 3, p. 11. There trace through letters in like manner to the family **ACERACEAE**, page 148. Comparing the plant with the family description, whose chief characteristics are in italics, it is found to agree. Since there is only one genus (**ACER**) in this family, no key is necessary, and it follows directly. To the right of it is the common name of the group, MAPLE. Comparing the plant with the genus description, short in this case, it is found to agree. Under it compare A with AA, tracing it to A; compare then B, BB, BBB, finding it goes to BB. Then follows W. C. E., which gives its distribution (see abbreviations, p. 5); then follows **A. macrophyllum**, the scientific name. In this **A.** is the abbreviation of the genus name, **ACER**; and **macrophyllum** is the species name. "Large-leaved Maple" follows, and is the common name of this particular maple.

That the book is free from errors is not a reasonable hope on account of the great amount of detail of fact and arrangement. We would be glad to have our attention called to errors that they may be corrected in future editions.

T. C. FRYE,
GEO. B. RIGG.

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ABBREVIATIONS

C. = In the Cascade Mountains.

E. = East of the Cascade Mountains.

F. & R. = Frye & Rigg's Northwest Flora ; University Bookstore, Seattle.

Gr. = Greek.

Jap. = Japanese.

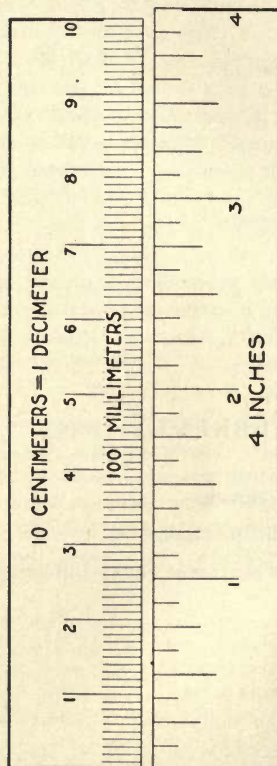
L. = Latin.

p. = page.

pp. = pages.

U. = Southwestern Oregon, and not otherwise west of the Cascade Mountains.

W. = West of the Cascade Mountains.



COMPARISON OF ENGLISH AND METRIC SCALES.

FAMILY KEY

A. GYMNOSPERMS (CONE BEARERS) — Trees or shrubs, evergreen (except *Larix*), cone-bearers (except *Taxus* and *Juniperus*); leaves either needles or scales; ovules not inclosed in an ovary.

B. Fruit a red berry; leaves complanate, scattered, needle-like, flat, sharply acute or acuminate; ovule 1; flowers dioecious, solitary, axillary.

TAXACEAE (p. 29)

BB. Fruit either a woody cone or a bluish berry; leaves not agreeing with the above in all points; ovules 2 to several on each scale; flowers mostly monoecious, mostly several grouped together forming cones; cones usually axillary.

PINACEAE (p. 29)

AA. ANGIOSPERMS (OVARY PLANTS) — Trees or shrubs or herbs, mostly not evergreen; inflorescence rarely conelike; leaves rarely needles or scales; ovules inclosed in an ovary.

C. MONOCOTYLEDONS — Herbs or one a vining shrub (*Smilax*), some leafless and floating; leaves parallel-veined, or the chief veins from the base, or 1-veined, or none; flower parts in 3's, rarely in 4's, never in 5's; wood usually in bundles scattered throughout the stem; cotyledon 1.

D. Plants free-floating; body thalloid, without a distinct stem or leaf; roots unbranched or none.

LEMNACEAE (p. 51)

DD. Plants not free-floating, or if so having leaves; leaves usually present; stem present or the leaves tufted at base; roots present, usually branched.

E. Leaves narrow, linear or grasslike.

GROUP 1 (p. 7)

EE. Leaves none, or mere scales, or at least some of them too wide to be linear.

GROUP 2 (p. 9)

CC. DICOTYLEDONS — Herbs or shrubs or trees, never leafless when floating; leaves netted-veined, or the chief veins from the base, or 1-veined, or none; flower parts rarely in 3's, mostly in 4's or 5's; wood usually in a circle or in several concentric circles about a central pith; cotyledons 2.

KEY TO THE DICOTYLEDONS (p. 10)

GROUP 1 — Monocotyledons with narrow leaves

A. Plants growing in salt water near the low-tide line, submerged in the sea; leaves 3–20 dm. long, flat or folded lengthwise.

NAIADACEAE (p. 34)

AA. Plants not growing near the low-tide line of the sea, although sometimes growing along seashores; leaves often not as above.

B. Plants submerged in fresh or saline waters; leaves opposite or whorled, not over 5 mm. wide.

C. Leaves toothed at margin, 0.4–2 mm. wide, 8–25 mm. long.

Najas in NAIADACEAE (p. 34)

CC. Leaves entire.

D. Leaves 1 mm. or less wide, 2-10 cm. long; stipules 2 cm. or less long.

Zannichellia in NAIADACEAE (p. 34)

DD. Leaves 2-4 mm. wide, 0.5-1 cm. long; stipules none.

Philotria in HYDROCHARITACEAE (p. 36)

BB. Either not water plants, or else the leaves alternate or all basal or none or rarely a few of the upper opposite; leaves often more than 5 mm. wide.

E. Plants submerged or partly floating, but nothing other than the inflorescence rising out of the water.

F. Plant stemless; leaves basal, terete, 1-45 mm. in diameter.

Lilaea in NAIADACEAE (p. 34)

FF. Plants with evident stem; leaves mostly flat, less than 1.5 mm. in diameter if terete.

G. Leaves either with distinct dilated stipular sheath or with axillary stipules; flowers greenish, 4 to many in an umbel-like or spikelike cluster.

NAIADACEAE (p. 34)

GG. Leaves with neither dilated sheath nor axillary stipules.

H. Leaves equitant; flowers 10 or more in a head, monoecious, greenish or whitish.

SPARGANIACEAE (p. 34)

HH. Leaves not equitant; flowers 1-2 in a cluster, perfect, bright yellow.

PONTEDERIACEAE (p. 51)

EE. Plants not submerged nor floating, at least rising out of the water if growing in it.

I. Flowers in a spadix; leaves resembling those of cat-tails.

Acorus in ARACEAE (p. 51)

II. Flowers not in a spadix; leaves often not as above.

J. Flowers surrounded by chaffy bracts or bristles or fine hairs, and no other perianth present, or no perianth at all.

K. Cat-tails; perianth of many fine hairs; flowers in a cylindric spikelike cluster 10 cm. or more long and 2-2.5 cm. in diameter. TYPHACEAE (p. 34)

KK. Not cat-tails; perianth none, or of chaffy bracts, or of stiff usually serrate bristles, or of fine hairs (*Eriophorum*); flowers either not in spikes or the spikes smaller.

L. Perianth of 1-3 chaffy bracts, or of hairs or bristles, or none at all; ovary 1-celled, 1-seeded; stems hollow or not so; flowers often in spikelets.

M. Flowers monoecious, each subtended by 3 chaffy bracts; fruits aggregated into spherical burlike heads; growing along borders of ponds in mud or shallow water.

SPARGANIACEAE (p. 34)

MM. Flowers mostly perfect, each subtended by 1-2 chaffy bracts; fruits rarely aggregated into spherical burlike heads; often growing on dry land.

N. Leaves 2-ranked; margins of leaf sheath not united; stem hollow in nearly all species; fruit a grain.

GRAMINACEAE (p. 36)

NN. Leaves 3-ranked; margins of leaf sheath united; stem solid; fruit an akene.

CYPERACEAE (p. 50)

LL. Perianth of 6 similar chaffy bracts; ovary either 3-celled or 1-celled with 3 parietal placentae, 3 to many seeded; stem not hollow; flowers not in spikelets.

JUNCACEAE (p. 52)

- JJ.** Flowers with green or colored perianth which is not chaff nor hair-like nor bristle-like.
- O.** Leaves without petiole, sheathing at base; sheath dilated and projecting as stipular points where it joins the blade; ovary superior; perianth small, green, not flower-like. JUNCAGINACEAE (p. 35)
- OO.** Leaves often petioled, sometimes sheathing at base, but in such case the sheath not projecting as stipular points where it joins the blade; ovary superior or inferior; perianth often conspicuous and colored, flower-like even when greenish.
- P.** Ovary superior; flowers regular.
See MELANTHACEAE, LILIACEAE, and CONVALLARIACEAE (p. 52)
- PP.** Ovary inferior; flowers regular or irregular.
- Q.** Leaves equitant; flowers regular; stamens and style not coherent; anthers 3. IRIDACEAE (p. 65)
- QQ.** Leaves not equitant; flowers irregular; stamens and style coherent; anthers 1-2. ORCHIDACEAE (p. 66)

GROUP 2 — Monocotyledons with wide leaves

- A.** Plant with a skunk-like odor; leaves 3-10 dm. long, oval; flowers forming a fleshy cone (spadix) 5-15 cm. long, surrounded by a bright yellow leaf (spathe).
Lysichiton in ARACEAE (p. 51)
- AA.** Plant without skunk-like odor; leaves either not oval or smaller; inflorescence not as above.
- B.** Leaves more than 2, all basal, ovate or oval to triangular-sagittate; petioles rather long; growing in mud or water along ponds. ALISMACEAE (p. 35)
- BB.** Leaves not as above in all points.
- C.** Plant submerged, although sometimes with floating leaves; flowers in spikes, inconspicuous. *Potamogeton* in NAIADACEAE (p. 34)
- CC.** Plant not submerged, although occasionally growing in wet places; flowers sometimes in spikes, mostly conspicuous.
- D.** Perianth regular; ovary superior except in IRIDACEAE.
- E.** Flowers enveloped by chaffy bracts and without other perianth; bracts of the perianth green or brown, less than 1 cm. long; plants rushlike or grasslike. JUNCACEAE (p. 52)
- EE.** Flowers with white or colored corolla or perianth; perianth not chaffy, mostly more than 1 cm. long; plants mostly not rushlike but often grasslike.
- F.** Ovary superior; leaves mostly not equitant; either stamens 4 or 6, or else 3 and also 3 staminodia.
- G.** Herbs, without tendrils.
See MELANTHACEAE, LILIACEAE, and CONVALLARIACEAE (p. 52)
- GG.** Climbing shrubs, with stipular tendrils. SMILACEAE (p. 64)
- FF.** Ovary inferior; leaves equitant; stamens 3; staminodia none. IRIDACEAE (p. 65)
- DD.** Perianth irregular; ovary inferior. ORCHIDACEAE (p. 66)

KEY TO THE DICOTYLEDONS

- A. Trees or shrubs (including woody vines).
 - B. Leaves opposite. GROUP 3 (p. 11)
 - BB. Leaves alternate.
 - C. Trees. GROUP 4 (p. 13)
 - CC. Shrubs.
 - D. Leaves compound. GROUP 5 (p. 14)
 - DD. Leaves simple.
 - E. Branches with spines or prickles; leaves not evergreen. GROUP 6 (p. 14)
 - EE. Branches without spines or prickles.
 - F. Leaves evergreen. GROUP 7 (p. 15)
 - FF. Leaves deciduous. GROUP 8 (p. 16)
- AA. Herbs.
 - G. Stems 12 mm. or more thick, very fleshy; leaves represented by conspicuous spines. CACTACEAE (p. 155)
 - GG. Stems either not so thick or else not fleshy; leaves not mere spines in case the stem is fleshy.
 - H. Leaves opposite or whorled.
 - I. Leaves compound. GROUP 9 (p. 17)
 - II. Leaves simple.
 - J. Plant prostrate, matted, very prickly; leaves awl-shaped, 6-10 mm. long, prickle-pointed, very dense; on sand near the seashore. ILLECEBRACEAE (p. 94)
 - JJ. Not as above in all points.
 - K. Plant parasitic on the branches of trees; leaves mere scales or normal, thick, mostly olive or whitish green. LORANTHACEAE (p. 78)
 - KK. Plants not parasitic on the branches of trees; leaves various, usually normal.
 - L. Plant densely hoary with stellate hairs, straight hairs also present; leaves ovate, entire, obtuse, at base cuneate or rounded, 1-5 cm. long. *Piscaria* in EUPHORBIACEAE (p. 145)
 - LL. Plant not hoary with stellate pubescence; leaves mostly not fitting the above.
 - M. Leaves in whorls of 3 or more, the whorls scattered along elongated stems. GROUP 10 (p. 18)
 - MM. Leaves opposite or merely in a basal or a terminal whorl.
 - N. Plants submerged or in water or in very wet places; leaves 2 cm. or less long, entire; submerged leaves lanceolate or narrower; floating or emersed leaves linear to obovate; plant chickweed-like in appearance, slender, 5-45 cm. high or long; ovary 4-celled; styles 2. CALLITRICHACEAE (p. 146)
 - NN. Plants not as above in all the vegetative characters.
 - O. Stems prickly; flowers in heads; leaves 10-15 cm. long, lanceolate, sessile; flower parts in 4's. DIPSACACEAE (p. 215)
 - OO. Either stems not prickly or flowers not in heads.
 - P. Twining vines with palmately veined and lobed leaves. *Humulus* in MORACEAE (p. 76)
 - PP. Not vines, or if so leaves not as above.

- Q. Corolla none or of separate petals.
 - R. Ovary and fruit superior. **GROUP 11** (p. 18)
 - RR. Ovary and fruit inferior. **GROUP 12** (p. 20)
- QQ. Corolla of united petals.
 - S. Plants with milky juice.
 - T. Ovaries distinct but their styles and stigmas united, carpels later separating into 2 distinct fruits; stamens mostly monadelphous; pollen united into waxy masses. **ASCLEPIADACEAE** (p. 181)
 - TT. Carpels quite distinct even in flowering; stamens distinct; pollen of simple grains. **APOCYNACEAE** (p. 181)
 - SS. Plants without milky juice. **GROUP 13** (p. 20)
- HH. Leaves alternate or all basal.
 - U. Leaves compound. **GROUP 14** (p. 21)
 - UU. Leaves simple.
 - V. Plants without green color; either white or yellow or red or brown. **GROUP 15** (p. 23)
 - VV. Plants with green color, although also often with other colors present.
 - W. Petals none, but calyx often petal-like. **GROUP 16** (p. 23)
 - WW. Petals present, distinct to base.
 - X. Stamens many, at least more than 10 and twice as many as petals. **GROUP 17** (p. 25)
 - XX. Stamens 10 or fewer, or if more not exceeding twice the number of petals. **GROUP 18** (p. 26)
 - WWW. Petals present, more or less united. **GROUP 19** (p. 27)

GROUP 3 — Trees and shrubs with opposite leaves

- A. Leaves compound.
 - B. Plants vinelike, climbing by their petioles; fruit a head of akenes with plumose tails. *Clematis* in **RANUNCULACEAE** (p. 95)
 - BB. Plants not vinelike, not at all climbing; fruit not as above.
 - C. Leaflets entire or very nearly so; fruit 1-winged. **OLEACEAE** (p. 178)
 - CC. Leaflets serrate or toothed; fruit either 2-winged or a berry.
 - D. Leaflets serrate with close regular equal projections; fruit a berry, not winged. *Sambucus* in **CAPRIFOLIACEAE** (p. 212)
 - DD. Leaflets toothed or lobed with irregular unequal projections; fruit dry, 2-winged. **ACERACEAE** (p. 148)
 - AA. Leaves simple.
 - E. Leaves palmately veined, or with 3 or more large veins from the base.
 - F. Vines, climbing by tendrils. **VITACEAE** (p. 150)
 - FF. Not vines, erect or spreading.
 - G. Leaves palmately lobed.
 - H. Fruit a red drupe, not winged; flowers in cymes; shrubs 6-30 dm. high. *Viburnum* in **CAPRIFOLIACEAE** (p. 212)
 - HH. Fruit dry, 2-winged; flowers in racemes or fascicles; shrubs or trees. **ACERACEAE** (p. 148)
 - GG. Leaves not palmately lobed, although sometimes coarsely dentate.
 - I. Leaves acute; stipules none; petals distinct to base; fruit a capsule. **HYDRANGEACEAE** (p. 123)

- II. Leaves rounded at both ends; stipules present; petals united at base; fruit a drupe. *Viburnum* in CAPRIFOLIACEAE (p. 212)
- EE. Leaves pinnately veined, with only 1 large vein from the base.
- J. Plants parasitic on trees; leaves entire, often scalelike. LORANTHACEAE (p. 78)
- JJ. Plants not parasitic; leaves entire or not entire. usually not scalelike.
- K. Leaves densely scurfy at least beneath. ELEAGNACEAE (p. 156)
- KK. Leaves not scurfy.
- L. Plants hoary, 3-6 dm. high, erect; bark ashy-gray, shreddy; leaves 2.5 cm. or less long, entire, obtuse or retuse, spatulate to obovate. *Ramona* in MENTHACEAE (p. 194)
- LL. Plants not hoary, often taller or vinelike; bark not as above; leaves various.
- M. Leaves scalelike, 2-4 mm. long; plants 3 dm. or less high, erect or ascending. *Cassiope* in ERICACEAE (p. 171)
- MM. Leaves not scalelike, mostly longer; plants various.
- N. Small creeping vine with mint odor. *Micromeria* in MENTHACEAE (p. 194)
- NN. Either not a vine or one without mint odor.
- O. Vines, twining or merely creeping. CAPRIFOLIACEAE (p. 212)
- OO. Not vines, erect or decumbent.
- P. Petals united; leaves entire or coarsely lobed.
- Q. Plants of peat bogs; leaf margin revolute; ovary superior; fruit dry. *Kalmia* in ERICACEAE (p. 171)
- QQ. Not plants of peat bogs; leaf margin plane.
- R. Ovary inferior; stamens all anther-bearing, as many as the corolla lobes; either fruit berry-like or plant creeping. CAPRIFOLIACEAE (p. 212)
- RR. Ovary superior; anther-bearing stamens 1 fewer than the corolla lobes, antherless stamen 1; fruit dry; plant not creeping. SCROPHULARIACEAE (p. 198)
- PP. Petals distinct; leaves entire or serrulate or spinose-toothed.
- S. Twigs conspicuously 4-angled.
- T. Leaves entire, evergreen, obtuse or acutish. *Garrya* in CORNACEAE (p. 168)
- TT. Leaves serrulate, deciduous, acuminate. *Euonymus* in CELASTRACEAE (p. 147)
- SS. Twigs not 4-angled.
- U. Leaves 3 cm. or more long, entire; stipules minute. CORNACEAE (p. 168)
- UU. Leaves 3 cm. or less long, serrulate at least above the middle or spine-toothed or rarely quite entire; stipules either none, or large and warty.
- V. Leaves serrulate above the middle, without conspicuous divergent parallel veins; flower parts in 4's; ovary 2-celled. *Pachistima* in CELASTRACEAE (p. 147)
- VV. Leaves either entire or spine-toothed near the apex, with numerous conspicuous straight parallel veins diverging from the midvein; flower parts in 5's; ovary 3-celled. *Ceanothus* in RHAMNACEAE (p. 149)

GROUP 4 — Trees with alternate leaves

- A. Leaves compound. *Sorbus* in MALACEAE (p. 132)
- AA. Leaves simple.
- B. Leaves coriaceous, evergreen.
- C. Bark conspicuously reddish, peeling off in great patches; leaves oval or elliptical, 7–15 cm. long; fruit a red berry. *Arbutus* in ERICACEAE (p. 171)
- CC. Bark not conspicuously reddish, not conspicuously peeling off; leaves various.
- D. Leaves oblanceolate, 5–10 cm. long, 12–25 mm. wide, either entire or serrate near the tip. MYRICACEAE (p. 73)
- DD. Leaves not oblanceolate, often not as above in size or margin.
- E. Leaves either cuneate-obovate, or else lanceolate and only 1–2.5 cm. long; fruit akenes, with hairy tails 5–15 cm. long. *Cercocarpus* in ROSACEAE (p. 125)
- EE. Leaves not cuneate-obovate, not lanceolate unless more than 2.5 cm. long; fruit not akenes, not tailed.
- F. Leaves lanceolate, acute, entire, glabrous on both sides, not scurfy; fruit a drupe about 2 cm. long. LAURACEAE (p. 104)
- FF. Leaves either not lanceolate or scurfy beneath if so; fruit dry, a nut (acorn) in a cup, or else several nuts in a long prickly involucre. FAGACEAE (p. 75)
- BB. Leaves mostly herbaceous, deciduous.
- G. Bark plainly splitting around the trunk rather than longitudinally.
- H. Flowers in aments or conelike clusters, sessile; fruits grouped into a dry conelike mass; terminal winter buds none. BETULACEAE (p. 73)
- HH. Flowers in racemes or umbels, pedicelled; fruits separate, fleshy, drupes; terminal winter buds present. AMYGDALACEAE (p. 134)
- GG. Bark splitting longitudinally.
- I. Staminate flowers in aments and sometimes the pistillate flowers also.
- J. Fruit an aggregate berry, blackberry-like. *Morus* in MORACEAE (p. 76)
- JJ. Fruit dry, nutlike or conelike.
- K. Fruit a cup containing an acorn; leaves often deeply lobed or cleft; primary lateral veins extending into the teeth; winter buds with more than 2 scales; terminal winter buds present. FAGACEAE (p. 75)
- KK. Fruits in a conelike or ament-like cluster; leaves in most species shallowly if at all lobed; bud scales 1 to many; terminal winter buds present or none.
- L. Primary lateral leaf veins extending into the teeth or lobes; seed a winged nutlet; calyx present; bracts thick in fruit. BETULACEAE (p. 73)
- LL. Primary lateral leaf veins arching and uniting within the margins; seed hairy; calyx none; bracts thin in fruit. SALICACEAE (p. 70)
- II. Flowers not in aments.
- M. Leaves ovate, somewhat falcate, distinctly oblique at base, coarsely serrate, 3-veined from the base. *Cellis* in ULMACEAE (p. 76)
- MM. Leaves not as above in all the characters mentioned.
- N. Fruit dry, wing-margined. *Ulmus* in ULMACEAE (p. 76)
- NN. Fruit fleshy, not even angular.
- O. Petals 6 mm. or more long; stamens many; leaves usually distinctly serrate; winter buds covered with scales. MALACEAE (p. 132)

OO. Petals 5 mm. or less long; stamens 5; leaves entire or finely serrate; winter buds naked; taste of the bark characteristic.

Rhamnus in RHAMNACEAE (p. 149)

GROUP 5 — Shrubs with alternate compound leaves

A. Leaves evergreen, coriaceous, spine-toothed at margin, bunched at the stem tips; stems not prickly. *Berberis* in BERBERIDACEAE (p. 103)

AA. Leaves deciduous or evergreen; the evergreen plants with leaves scattered along prickly stems and without spine-toothed leaf margins.

B. Twigs dark-green, sharply 4-angled, very long; leaflets 3, 2.5 cm. or less long, leaves not abundant; fruit a beanlike pod. *Cytisus* in LEGUMINACEAE (p. 135)

BB. Twigs not dark-green, not angled; leaves and leaflets various; fruit not beanlike.

C. Either vines or else plants, with prickly stems. ROSACEAE (p. 125)

CC. Not vines; stems not prickly.

D. Leaflets 7-31; fruit red.

E. Leaflets 13-31, acuminate; stem simple or very little branched; inflorescence conical, hairy; fruit with red hairs. ANACARDIACEAE (p. 147)

EE. Leaflets 7-17, acute to obtuse; stem considerably branched; inflorescence flat-topped, glabrous; fruit red, glabrous. *Sorbus* in MALACEAE (p. 132)

DD. Leaflets 3-7; fruit red or some other color.

F. Leaflets subulate to linear, sharp-pointed. POLEMONIACEAE (p. 183)

FF. Leaflets not subulate nor sharp-pointed.

G. Leaflets 0.4-2.5 cm. long; either the plant silky-villous or the leaflets cuneiform. ROSACEAE (p. 125)

GG. Leaflets 2.5-7.5 cm. long; plant glabrous; leaflets not cuneiform. ANACARDIACEAE (p. 147)

GROUP 6 — Shrubs with alternate simple deciduous leaves and spiny or prickly branches

A. Leaves palmately veined.

B. Twigs 12-25 mm. thick; leaves 15-40 cm. wide; inflorescence terminal, conical, of very many flowers. *Echinopanax* in ARALIACEAE (p. 162)

BB. Twigs 6 mm. or less thick; leaves 7 cm. or less wide; inflorescence lateral and few-flowered, or flowers solitary in the leaf axils.

C. Plant prostrate, creeping. *Rubus* in ROSACEAE (p. 125)

CC. Plant erect or spreading. GROSSULARIACEAE (p. 124)

AA. Leaves pinnately veined or 1-veined.

D. Spines few, very stout, 1.5-5 cm. long; leaves serrate, ovate to obovate, 2.5-7.5 cm. long. *Crataegus* in MALACEAE (p. 132)

DD. Spines more slender, often shorter; leaves entire, usually narrower and shorter.

E. Leaves 8-12 mm. long; petals white. *Forsellesia* in CELASTRACEAE (p. 147)

EE. Leaves 12-37 mm. long; petals yellow or none.

F. Flowers in heads; at least the young parts of the plant white-woolly; petals yellow. *Tetradymia* in COMPOSITACEAE (p. 218)

FF. Flowers not in heads; young parts of the plant often mealy or pubescent but rarely white-woolly; petals yellow or none.

- G. Petals yellow, 10-15 mm. long; leaves sometimes lanceolate, mostly acicular and about 12 mm. long. *Ulex* in LEGUMINACEAE (p. 135)
- GG. Petals none; leaves linear to obovate, 12-37 mm. long. CHENOPODIACEAE (p. 83)

GROUP 7 — Shrubs with alternate simple evergreen leaves and without spines or prickles on the branches

- A. Staminate flowers in aments; fruits in an ament-like cluster, or composed of a nut (acorn) in an involucre cup, or composed of 1-3 nuts in a very spiny involucre cup covering.
- B. Leaves oblanceolate, mostly serrate near the tip, not scurfy beneath; fruits in an ament-like cluster. MYRICACEAE (p. 73)
- BB. Leaves either not oblanceolate, or else scurfy beneath and the margin entire. FAGACEAE (p. 75)
- AA. Flowers not in aments; fruit not as above.
- C. Petals none or distinct to the base.
- D. Sepals 3 or 6; petals 3 or none; leaves with only 1 chief vein from the base.
- E. Leaves not aromatic, linear-oblong, crowded, obtuse, 4-8 mm. long, revolute at margin; stamens 2-4; ovaries 2 to several; drupe 4-6 mm. long; plant 1-4.5 dm. high. EMPETRACEAE (p. 146)
- EE. Leaves very aromatic, lanceolate-oblong, acute, rounded to acute at base, 5-10 cm. long, not revolute at margin; stamens 9; ovary 1; drupe 20-25 mm. long; plant 3-21 m. high. LAURACEAE (p. 104)
- DD. Sepals 4-5; petals 4-5 or none.
- F. Petals none; stamens 15-25; fruit an akene, with a hairy tail 5-10 cm. long. *Cercocarpus* in ROSACEAE (p. 125)
- FF. Petals present; stamens 10 or fewer; fruit either fleshy or a capsule, not tailed.
- G. Leaves either densely woolly beneath, or with red hairs on the petiole and the veins beneath. *Ledum* in ERICACEAE (p. 171)
- GG. Leaves not woolly beneath, glabrous or nearly so.
- H. Shrub 7.5-30 cm. high; leaves sharply serrate; stamens 10; ovary 5-celled. *Chimaphila* in PYROLACEAE (p. 169)
- HH. Shrub taller; leaves entire or serrulate; stamens 4-5; ovary 2-4-celled. RHAMNACEAE (p. 149)
- CC. Petals and sepals both present; petals more or less united into 1 piece.
- I. Ovary inferior; leaves oval to ovate, 2.5 cm. or less long, not densely crowded. VACCINIACEAE (p. 174)
- II. Ovary superior; leaves often not agreeing with the above.
- J. Leaves lanceolate, 7.5-15 cm. long; corolla purple, 10-13 mm. long, tubular or funnelform. *Eriodictyon* in HYDROPHYLLACEAE (p. 185)
- JJ. Leaves either not lanceolate or else smaller; corolla not as above in all points. ERICACEAE (p. 171)

GROUP 8 — Shrubs with alternate simple deciduous leaves and without spines or prickles on the branches

- A. Leaves pinnately or palmately 3-9-parted or -divided; leaf segments subulate or linear, sharp-pointed, 8-20 mm. long. POLEMONIACEAE (p. 183)
- AA. Leaves not as above in all points.
 - B. Staminate and sometimes also the pistillate flowers in aments.
 - C. Ovary superior; pistillate flowers also in aments; flowers monoecious or dioecious.
 - D. Calyx none; bracts thin in fruit; seed not winged.
 - E. Bracts scaly; fruit a 1-seeded nutlet, wax-coated or drupelike; seed not hairy; winter buds with many scales. MYRICACEAE (p. 73)
 - EE. Bracts herbaceous; fruit a many-seeded capsule, neither wax-coated nor drupelike; seed hairy; winter buds with only 1 scale. SALICACEAE (p. 70)
 - DD. Calyx present; bracts thick in fruit; seed a winged nutlet. BETULACEAE (p. 73)
- CC. Ovary inferior; pistillate flowers few or solitary, not in aments; flowers monoecious.
 - F. Nut in a spineless and either foliaceous or tubular involucre; anther cells separate; leaves velvety to the touch. *Corylus* in BETULACEAE (p. 73)
 - FF. Nut either in a spiny or in a cuplike involucre; anthers 2-celled; leaves not velvety to the touch. FAGACEAE (p. 75)
- BB. Flowers in heads. COMPOSITACEAE (p. 218)
- BBB. Flowers neither in aments nor in heads, though sometimes in dense spikes.
- G. Leaves palmately veined or 3-veined from the base.
 - H. Leaves more or less lobed.
 - I. Pistils more than 1; fruit either dry or else an aggregate composed of the ripened ovaries. ROSACEAE (p. 125)
 - II. Pistil only 1; fruit a berry composed of the single ripened ovary. GROSSULARIACEAE (p. 124)
- HH. Leaves not at all lobed.
 - J. Leaves somewhat falcate, very unequal at base, sharply serrate, acute or acuminate. ULMACEAE (p. 76)
 - JJ. Leaves not falcate, equal at base, often with margin and apex not as above. RHAMNACEAE (p. 149)
- GG. Leaves 1-veined, or pinnately veined with only 1 chief vein from the base.
- K. Petals none; leaves entire.
 - L. Stipules present; plant not mealy; sepals petal-like or scarious or scale-like. POLYGONACEAE (p. 79)
 - LL. Stipules none; young parts of the plant often mealy; sepals herbaceous. CHENOPODIACEAE (p. 83)
- KK. Petals present; leaves entire or not.
- M. Ovary superior.
- N. Petals distinct to base.
 - O. Stamens many, 25 or more; pistils often more than 1.
 - P. Fruit 1 or more dry pods or akenes. ROSACEAE (p. 125)
 - PP. Fruit 1-5 fleshy drupes. AMYGDALACEAE (p. 134)

OO. Stamens 4-10; pistil only 1.

Q. Flowers solitary, terminal or in the axils, red; stamens 10; leaves lanceolate, petiole and the veins beneath red-hairy.

Cladothamnus in ERICACEAE (p. 171)

QQ. Flowers in clusters, white or blue; stamens 4-5; leaves not as above.

RHAMNACEAE (p. 149)

NN. Petals more or less united into 1 piece.

R. Ovary and fruit 2-celled; corolla rotate; fruit a red or blue berry.

Solanum in SOLANACEAE (p. 197)

RR. Ovary and fruit 3-5-celled; corolla campanulate to urn-shaped, or when rotate the fruit dry.

ERICACEAE (p. 171)

MM. Ovary inferior.

S. Petals distinct; twigs not 4-angled nor conspicuously green; stamens 20.

MALACEAE (p. 132)

SS. Petals more or less united into 1 piece; twigs somewhat 4-angled and dark-green; stamens 10 or fewer.

VACCINIACEAE (p. 174)

GROUP 9—Dicotyledonous herbs with compound leaves either opposite or in whorls

A. Plants submerged or floating; leaves dissected into capillary or very narrow segments.

B. Leaves 5-12 in a whorl; leaf segments often with some teeth and thus stag-horn-like.

CERATOPHYLLACEAE (p. 95)

BB. Leaves alternate or opposite or not over 4 in a whorl; leaf segments without teeth, not stag-horn-like.

C. Leaf segments all pinnately arranged on the leaf axis; leaves without bladders.

Myriophyllum in HALORAGIDACEAE (p. 162)

CC. Leaves repeatedly dichotomous; leaf segments not pinnately arranged on the leaf axis; leaves often with bladders.

Utricularia in PINGUICULACEAE (p. 210)

AA. Plants either not growing in water, or else their leaves divided into wider segments or leaflets.

D. Petals distinct.

E. Pistils several, in fruit each with a plumose tail 2.5-5 cm. long; leaflets not terete; plants often somewhat vining.

Clematis in RANUNCULACEAE (p. 95)

EE. Pistils 1-2, without plumose tail even in fruit.

F. Leaves sessile, divided into terete fleshy segments from the base, thus appearing to be whorled; carpels 5, united; ovary superior, 1-celled; sepals 4-6 mm. long.

Spergula in CARYOPHYLLACEAE (p. 90)

FF. Leaves evidently not whorled; leaf segments not terete; carpels 2, loosely connected, each 1-celled; ovary inferior; sepals less than 4 mm. long.

UMBELLACEAE (p. 163)

FFF. Leaves pinnately compound, not whorled; leaf segments not terete; carpels 5, united, each 1-celled; ovary superior; sepals 2-8 mm. long.

Erodium in GERANIACEAE (p. 143)

DD. Petals united at least at the base.

G. Ovary superior or mainly so.

H. Leaves whorled.

Pedicularis in SCROPHULARIACEAE (p. 198)

HH. Leaves opposite.

- I. Style 1, 3-lobed at apex; capsule 3-valved, 3-celled; placentae usually axial. POLEMONIACEAE (p. 183)
- II. Styles 2, often more or less united at base, sometimes united nearly to apex; capsule 2-valved, 1-celled; placentae 2, parietal. .
Nemophila in HYDROPHYLLACEAE (p. 185)
- GG. Ovary inferior or mainly so.
- J. Flowers in terminal cymes; stamens 3; leaves 3-5-foliolate. *Valeriana* in VALERIANACEAE (p. 214)
- JJ. Flowers in heads; stamens 4-5; leaves various. COMPOSITACEAE (p. 218)

GROUP 10 — Dicotyledonous herbs with simple leaves in whorls of 3 or more scattered along the stem

- A. Stem square; leaves 4-8 in a whorl; fruit very deeply 2-lobed or separating into 2 distinct carpels. *Galium* in RUBIACEAE (p. 211)
- AA. Either the stem terete or else the leaves in whorls of 2-3; fruit not deeply lobed, not separating into distinct carpels.
- B. Plants growing in water; stem simple; stamen 1. *Hippuris* in HALORAGIDACEAE (p. 162)
- BB. Plants of ordinary dry soil; stem normally not simple; stamens 2-10 (in *Euphorbia* only 1).
- C. Leaves terete, 8-16 in a whorl; styles 5. *Spergula* in CARYOPHYLLACEAE (p. 90)
- CC. Leaves flat, 2-6 in a whorl; styles 1 or 3.
- D. Leaves 4-6 in a whorl, 2.5 cm. or less long, spatulate or oblanceolate; stems prostrate; styles 3. AIZOACEAE (p. 86)
- DD. Leaves 2-4 in a whorl, often longer, blade often widest below its middle; stems not prostrate (except sometimes in *Euphorbia*).
- E. Sepals 2-3, distinct; petals 4 or 6, distinct. *Platystigma* in PAPAVERACEAE (p. 104)
- EE. Sepals either none or 4-8 and all somewhat united into 1 piece; petals none or united into 1 piece.
- F. Corolla present; stamens 4-8.
- G. Leaves in several whorls along an elongated stem. SCROPHULARIACEAE (p. 198)
- GG. Leaves either not in whorls or the whorls merely basal or terminal. PRIMULACEAE (p. 175)
- FF. Corolla none; stamens 1 or 2 or 3 or 9.
- H. Calyx present; stamens more than 1; fruit an akene, 3-angled. POLYGONACEAE (p. 79)
- HH. Calyx none; stamen 1; fruit a capsule, 3-celled, terete or nearly so. *Euphorbia* in EUPHORBIACEAE (p. 145)

GROUP 11 — Apetalous or polypetalous dicotyledonous herbs with opposite simple leaves and superior ovary

- A. Petals none.
- B. Leaves 2-3-pinnatifid; leaf segments linear to lanceolate; pistils more than 1; fruit akenes with plumose tails 2.5-3.7 cm. long. *Clematis* in RANUNCULACEAE (p. 95)

- BB.** Leaves not dissected; pistil 1; fruit without plumose tail.
- C.** Plants with milky juice. *Euphorbia* in EUPHORBIACEAE (p. 145)
- CC.** Plants without milky juice.
- D.** Plants with stinging hairs; stems mostly simple, erect, 4-angled, 6-21 dm. high. *Urtica* in URTICACEAE (p. 76)
- DD.** Plants without stinging hairs; stems not as above in all points.
- E.** Seeds several to many.
- F.** Sepals 5; leaves entire or nearly so, ovate or narrower; styles or sessile stigmas 2-5. CARYOPHYLLACEAE (p. 89)
- FF.** Sepals 4; leaves crenate to pinnatifid, often reniform to orbicular; styles and stigmas 1-2.
- G.** Stamens 2 or 4; style 1; leaves not wedge-shaped at base. *Synthyris* in SCROPHULARIACEAE (p. 198)
- GG.** Stamens 8; styles 2; leaves wedge-shaped at base. *Chrysosplenium* in SAXIFRAGACEAE (p. 118)
- EE.** Seed 1.
- H.** Lower leaves 2-lobed, the upper entire; stem weak and slender; styles and stigmas 3. *Pterostegia* in POLYGONACEAE (p. 79)
- HH.** None of the leaves 2-lobed; stem stiff or fleshy; styles or stigmas 2. CHENOPODIACEAE (p. 83)
- AA.** Petals present.
- I.** Sepals 2; plants without milk juice. PORTULACACEAE (p. 86)
- II.** Sepals or calyx segments more than 2, or else plants with milky juice.
- J.** Leaves very fleshy, thick.
- K.** Stipules none; leaves terete or flattish; carpels distinct at least above, thus making the ovary 3-5-lobed. CRASSULACEAE (p. 117)
- KK.** Stipules scarious; leaves terete; carpels united to the tip and thus the ovary not lobed. *Tissa* in CARYOPHYLLACEAE (p. 94)
- JJ.** Leaves not fleshy, thin or coriaceous.
- L.** Leaves entire.
- M.** Leaves obovate, scattered along an elongated prostrate or floating stem; sepals and stamens 2-4. *Elatine* in ELATINACEAE (p. 152)
- MM.** Leaves not obovate; stems often not as above; sepals and stamens usually more numerous.
- N.** Leaves all basal; ovary 1-celled; placentae 3-4, parietal; sepals and petals and stamens 5 each. *Parnassia* in SAXIFRAGACEAE (p. 118)
- NN.** Leaves not all basal; ovary 1-18-celled; placentae axial or parietal; sepals and petals and stamens not always 5 each.
- O.** Sepals 2-3; ovary 3-18-celled; placentae parietal. PAPAVERACEAE (p. 104)
- OO.** Sepals 4-6; ovary 1-10-celled; placentae axial.
- P.** Leaves punctate with immersed pellucid resinous glands, often with small black spots; petals yellow, often black-spotted; stamens in 3 sets in all but 1 species. HYPERICACEAE (p. 152)
- PP.** Leaves not punctate, not black-spotted; petals not yellow (except in 1 species of *Linum*), not black-spotted; stamens not in sets.
- Q.** Stem 4-angled. LYTHRACEAE (p. 156)
- QQ.** Stem terete.

R. Leaves all opposite; ovary and capsule 1-celled; seed not oily.

CARYOPHYLLACEAE (p. 89)

RR. Some of the leaves alternate; ovary and capsule 2-10-celled; seed oily.

LINACEAE (p. 144)

LL. Leaves not entire.

S. Leaves evergreen, coriaceous, ovate to orbicular; flower 1, on a scape at the summit of the simple stem. *Moneses* in PYROLACEAE (p. 169)

SS. Leaves deciduous, herbaceous, narrowed; flowers mostly more than 1; stem usually branched.

T. Stipules present; plant glandular-pubescent; leaves oblanceolate.

Bergia in ELATINACEAE (p. 152)

TT. Stipules none; plant not glandular; leaves lanceolate to spatulate.

LINACEAE (p. 144)

GROUP 12 — Apetalous or polypetalous dicotyledonous herbs with opposite simple leaves and inferior ovary

A. Flowers in heads; heads subtended by a white involucre; involucre bracts 4-6, 6-17 mm. long; fruit a red berry. *Cornus* in CORNACEAE (p. 168)

AA. Either flowers not in heads or else involucre not white when present; fruit not a berry, not red.

B. Flowers in umbels or heads.

UMBELLACEAE (p. 163)

BB. Flowers neither in umbels nor heads.

C. Flowers in terminal or axillary involucre clusters.

NYCTAGINACEAE (p. 85)

CC. Flowers either not in clusters, or the clusters without involucre.

D. Leaves entire.

E. Leaves ovate to reniform, all basal, with 3-7 large veins from the base; marsh plants. *Parnassia* in SAXIFRAGACEAE (p. 118)

EE. Leaves narrower, not all basal, with only 1 large vein from the base; habitat various.

F. Stem 4-5-angled; leaves linear to linear-oblong; calyx tube less than 1 cm. long. LYTHRACEAE (p. 156)

FF. Stem terete; either the leaves wider than in F or the calyx tube more than 1 cm. long. ONAGRACEAE (p. 156)

DD. Leaves not entire.

G. Leaves roundish, abruptly cuneate at base, crenate above; petals none; stems repeatedly forked; flowers mostly solitary in the upper forks of the stem. *Chrysosplenium* in SAXIFRAGACEAE (p. 118)

GG. Leaves not fitting the above; petals 2-4; stems simple or pinnately branched; flowers in panicles or racemes. ONAGRACEAE (p. 156)

GROUP 13 — Dicotyledonous herbs with opposite simple leaves and sympetalous corolla

A. Ovary superior or mainly so.

B. Corolla regular or nearly so.

C. Leaves markedly thick and fleshy; stamens more numerous than the lobes of the corolla; pistils several, simple. CRASSULACEAE (p. 117)

- CC. Leaves not markedly thick and fleshy; stamens as many as the lobes of the corolla or fewer; pistil 1 and compound (except possibly in BORAGINACEAE).
 D. Ovary deeply 4-lobed, forming 4 separate or separable nutlets.
 BORAGINACEAE (p. 187)
 DD. Ovary deeply 2-lobed, separating or separable into 2 fleshy or dry fruits.
 RUBIACEAE (p. 211)
 DDD. Ovary not deeply lobed, neither separating nor separable into nutlets.
 E. Leaves evergreen, coriaceous; flowers terminal, solitary, or in a raceme or cyme or umbel; ovary and capsule 4-5-celled.
 PYROLACEAE (p. 169)
 EE. Leaves mostly not evergreen, not coriaceous; flowers not terminal when the leaves are evergreen.
 F. Style 1; stigmas 3; capsule 3-celled.
 POLEMONIACEAE (p. 183)
 FF. Styles 1-2; stigmas as many as the styles; capsule 1-2-celled.
 G. Leaves entire.
 H. Stamens often fewer than the corolla lobes; ovary either 2-celled or else 1-celled with parietal placentae.
 SCROPHULARIACEAE (p. 198)
 HH. Stamens as many as the corolla lobes; ovary 1-celled; placenta central.
 I. Stamens alternate with the corolla lobes; plant without potato-like base.
 GENTIANACEAE (p. 178)
 II. Stamens opposite the corolla lobes; plant from small potato-like base.
 Trientalis in PRIMULACEAE (p. 175)
 GG. Leaves not entire.
 J. Ovary and capsule 1-celled; stamens 5; leaves deeply pinnate-segmented.
 Nemophila in HYDROPHYLLACEAE (p. 185)
 JJ. Ovary and capsule 2-celled; stamens 2-5; leaves various.
 SCROPHULARIACEAE (p. 198)
 BB. Corolla irregular.
 K. Leaves all in a basal whorl.
 PINGUICULACEAE (p. 210)
 KK. Leaves not all in a basal whorl.
 L. Ovary 2-celled, many-seeded.
 SCROPHULARIACEAE (p. 198)
 LL. Ovary 4-celled, 4-seeded.
 M. Ovary deeply 4-lobed or -parted; flowers 1 to many in the leaf axils, or in terminal heads or spikes or racemes or panicles.
 MENTHACEAE (p. 192)
 MM. Ovary 4-celled, terete or nearly so; flowers in terminal solitary or clustered spikes.
 VERBENACEAE (p. 192)
 AA. Ovary inferior or mainly so.
 N. Vinelike, prostrate, evergreen; peduncles 2-flowered.
 Linnaea in CAPRIFOLIACEAE (p. 212)
 NN. Not vinelike, not prostrate, mostly not evergreen; peduncles not 2-flowered.
 O. Stamens 3, distinct; flowers in most species not in heads; calyx 4-toothed or -lobed, not a pappus.
 VALERIANACEAE (p. 214)
 OO. Stamens 4-5, their anthers united; flowers in heads; calyx in most species a pappus.
 COMPOSITACEAE (p. 218)

GROUP 14 — Dicotyledonous herbs with alternate compound leaves

- A. Plants submerged or floating; leaves dissected into narrowly linear or filiform segments or leaflets.

B. Leaves often with air bladders; corolla 2-lipped; pistil 1.

Utricularia in PINGUICULACEAE (p. 210)

BB. Leaves without bladders; corolla of 5 similar separate petals; pistils several.

RANUNCULACEAE (p. 95)

AA. Plants mostly of drier habitat; leaves with wider segments or leaflets.

C. Petals none or distinct to base.

D. Ovary superior.

E. Flowers regular.

F. Pistils more than 1.

G. Stamens on the calyx though often near its base; stipules usually present.

ROSACEAE (p. 125)

GG. Stamens on the receptacle; stipules none.

RANUNCULACEAE (p. 95)

FF. Pistil 1.

H. Leaves ternately or palmately compound.

I. Leaflets or leaf segments 3-5.

J. Styles 2; stamens 5 or 10.

SAXIFRAGACEAE (p. 118)

JJ. Style 1; stamens neither exactly 5 nor 10.

CAPPARIDACEAE (p. 116)

II. Leaflets or leaf segments more than 10.

K. Flowers white; sepals 4-6. *Eschscholtzia* in PAPAVERACEAE (p. 104)

KK. Flowers yellow; sepals 2.

RANUNCULACEAE (p. 95)

HH. Leaves pinnately compound.

L. Plants with mustard or turnip taste; stamens usually 6, tetradynamous.

CRUCIFERACEAE (p. 106)

LL. Plants without mustard or turnip taste; stamens very rarely 6, not tetradynamous.

M. Flowers in spikes or racemes; stigma 1; ovary simple; plants of meadows.

ROSACEAE (p. 125)

MM. Flowers solitary in the leaf axils; stigmas 2-5; ovary compound; plants of wet places.

LIMNANTHACEAE (p. 146)

EE. Flowers irregular.

N. Stamens 5 or 10; pistil 1.

LEGUMINACEAE (p. 135)

NN. Stamens 12 to many; pistils very rarely only 1.

O. Sepals 4; plants glandular-pubescent.

CAPPARIDACEAE (p. 116)

OO. Sepals 5; plants not glandular.

RANUNCULACEAE (p. 95)

DD. Ovary inferior.

P. Flowers in compound umbels; ovary 2-celled or the 2 carpels almost separate; fruit dry.

UMBELLACEAE (p. 163)

PP. Flowers in umbels; umbels in simple or compound panicles; ovary 2-5-celled; fruit fleshy.

Aralia in ARALIACEAE (p. 162)

CC. Petals more or less united, but sometimes only at their very base.

Q. Corolla irregular.

R. Sepals 4-5, more or less united; petals 5; stamens 5 or 9 or 10; pistil simple; stipules present.

LEGUMINACEAE (p. 135)

RR. Sepals 2, separate; petals 4; stamens 6; pistil compound; stipules none.

FUMARIACEAE (p. 105)

QQ. Corolla regular or very nearly so or none at all.

S. Ovary superior or mainly so.

T. Leaflets 3, not spinelike, not spine-tipped; styles or stigmas 1 or 5.

- U. Leaflets very unequal, the lateral two very much smaller than the terminal one. *Solanum* in SOLANACEAE (p. 197)
- UU. Leaflets all three about the same size.
- V. Marsh plants; leaflets oblong to obovate, obtuse; stems 1-2 cm. thick. *Menyanthes* in MENYANTHACEAE (p. 180)
- VV. Not marsh plants; leaflets obcordate; stems less than 5 mm. thick. OXALIDACEAE (p. 144)
- TT. Leaflets more than 3 or spinelike or spine-tipped; styles or stigmas 1-3.
- W. Stigmas 3; capsule 3-celled. POLEMONIACEAE (p. 183)
- WW. Stigmas 1-2; capsule 1-2-celled. HYDROPHYLLACEAE (p. 185)
- SS. Ovary inferior or mainly so; flowers in heads. COMPOSITACEAE (p. 218)

GROUP 15 — Dicotyledonous herbs without green color, and with alternate simple leaves or scales

- A. Vines, twining, white or yellow; ovary 2-celled, 1-4-seeded; leaves mere minute scales or almost none. CONVULVULACEAE (p. 182)
- AA. Not vines, variously colored; ovary not 2-celled, many-seeded; leaves not minute, larger.
- B. Leaves spatulate, covered with long glandular hairs, all basal; plants of peat bogs. DROSERACEAE (p. 116)
- BB. Leaves not spatulate, not covered with long glandular hairs, not all basal; plants not of peat bogs.
- C. Flowers irregular; stamens didynamous, inserted in the tube of the corolla; cells of the ovary 1. OROBANCHACEAE (p. 209)
- CC. Flowers regular or nearly so; stamens not didynamous, inserted on the receptacle; cells of the ovary 1 or 4 or 5.
- D. Plants reddish, glabrous, 25 mm. or less high; stem not densely covered with scales; scales entire; pollen grains in 4's. *Pyrola* in PYROLACEAE (p. 169)
- DD. Not as above in all points; pollen grains simple. MONOTROPACEAE (p. 170)

GROUP 16 — Dicotyledonous herbs with alternate simple leaves and apetalous flowers

- A. Ovary and fruit superior.
- B. Pistils more than 1, distinct.
- C. Plant 1-3.5 m. high; leaves ovate-lanceolate, pinnately veined, petioled, entire, 2-3 dm. long. PHYTOLACCACEAE (p. 86)
- CC. Plants mostly not so high; leaves not as above in all characters.
- D. Stamens on the calyx; stem 2-20 cm. long; leaves rounded, cuneate at base, 4-13 mm. long, deeply 3-lobed, lobes 2-4-cleft; stipules large, 2-5-cleft. *Alchemilla* in ROSACEAE (p. 125)
- DD. Stamens on the receptacle; stems often longer; leaves not as above in all characters; stipules none, but the base of the petiole often dilated. RANUNCULACEAE (p. 95)

- BB. Pistil only 1.
- E. Leaves lobed, palmately veined.
- F. Plant 2-20 cm. high, annual; leaves cuneate at base, 4-13 mm. long, deeply 3-lobed, lobes 2-4-cleft; stipules 2-5-cleft. *Alchemilla* in ROSACEAE (p. 125)
- FF. Plant often taller, perennial; leaves mostly cordate at base, 13 mm. or more long, shallowly lobed; lobes often not entire although not again cleft; stipules entire. *Heuchera* in SAXIFRAGACEAE (p. 118)
- EE. Leaves either not lobed or else pinnately veined.
- G. Plant stout, erect, 1-3.5 m. high; leaves entire, acute or acuminate at both ends, 2-3 dm. long; ovary 10-celled; fruit a purple berry.
PHYTOLACCACEAE (p. 86)
- GG. Plant mostly not fitting the above; leaves not as above in all points; ovary 1-5-celled; fruit not a berry, dry.
- H. Plant with a mustard or radish taste. CRUCIFERACEAE (p. 106)
- HH. Plant without a mustard or radish taste.
- I. Seeds 2 or more in each pistil.
- J. Plant with milky juice; ovary and capsule 3-celled; capsule 3-seeded. *Euphorbia* in EUPHORBIACEAE (p. 145)
- JJ. Plant without milky juice; ovary and capsule 2-celled; capsule many-seeded.
- K. Plant glabrous; leaves linear to lanceolate; flowers solitary in leaf axils. *Lythrum* in LYTHRACEAE (p. 156)
- KK. Plant white-woolly; leaves lanceolate to ovate; flowers in a dense terminal cylindrical spike. *Synthyris* in SCROPHULARIACEAE (p. 198)
- II. Seed 1 in each pistil.
- L. Plant densely hoary with stellate hairs, simple ones also present: in dry regions east of the Cascades. *Piscaria* in EUPHORBIACEAE (p. 145)
- LL. Plant without stellate hairs, often with simple ones; in either dry or moist regions.
- M. Leaves with sheathing stipules. POLYGONACEAE (p. 79)
- MM. Leaves without stipules.
- N. Either the akene 3-angled in cross section, or else the calyx of 6 segments. POLYGONACEAE (p. 79)
- NN. Akene or utricle not 3-angled in cross section; calyx never of more than 5 segments.
- O. Leaves entire, 3-veined from the base, lanceolate or ovate; stamens 4; style 1 or none. *Parietaria* in URTICACEAE (p. 76)
- OO. Leaves with not all 3 of the above characters; stamens sometimes 4; style sometimes 1.
- P. Leaves entire; flowers bracted; bracts and sepals scarious. AMARANTHACEAE (p. 84)
- PP. Leaves entire or not; either the flowers bractless or the bracts not scarious; sepals green or greenish. CHENOPODIACEAE (p. 83)
- AA. Ovary and fruit inferior.
- Q. Leaves pinnately veined or only 1-veined, entire or very nearly so.
- R. Leaves linear-setaceous. *Howellia* in LOBELIACEAE (p. 217)
- RR. Leaves wider.
- S. Stem terete; flowers in cymes; fruit fleshy, drupaceous. SANTALACEAE (p. 77)

SS. Stem 5-angled; flowers solitary in the leaf axils; fruit dry, a capsule.

Lythrum in LYTHRACEAE (p. 156)

QQ. Leaves palmately veined, entire or not.

T. Leaves 4-13 mm. long, cuneate at base, deeply 3-lobed, the lobes 2-4-cleft; stipules large, 2-5-cleft; stem 2-20 cm. long. *Alchemilla* in ROSACEAE (p. 125)

TT. Leaves longer, either not cuneate at base or not deeply lobed; stipules entire or none; stem often longer.

U. Leaves mostly in a basal tuft; stipules present; flowers in spikes or panicles; calyx lobes less than 1 cm. long; stamens 5; ovary 1-2-celled; stem without ginger taste. *Heuchera* in SAXIFRAGACEAE (p. 118)

UU. Leaves from an elongated creeping stem; stipules none; flowers solitary in the leaf axils; calyx lobes 2-6 cm. long; stamens 12; ovary 5-celled; stem with ginger taste. ARISTOLOCHIACEAE (p. 79)

GROUP 17 — Dicotyledonous herbs with alternate simple leaves and polypetalous flowers with numerous stamens

A. Leaves tubular or pitcher-shaped, 2-6 dm. long. SARRACENIACEAE (p. 116)

AA. Leaves not tubular nor pitcher-shaped, mostly less than 2 dm. long.

B. Leaves either peltate or else rounded or ovate, 10 cm. or more wide, entire, mostly floating. NYMPHAEACEAE (p. 94)

BB. Leaves not peltate, often not rounded or ovate, never so wide, often entire, mostly not floating.

C. Leaves entire.

D. Pistils more than 1.

E. Flowers solitary or scattered; petals with a pit on the inside; calyx of 5-6 distinct sepals; stamens on the receptacle. RANUNCULACEAE (p. 95)

EE. Flowers in spikes or panicles; petals without pit; calyx 5-cleft; stamens on the calyx tube. *Petrophytum* in ROSACEAE (p. 125)

DD. Pistil only 1.

F. Annual; leaves 2-6 mm. long, linear; petals 6; plants 2-5 cm. high.

Canbya in PAPAVERACEAE (p. 104)

FF. Annual or perennial; leaves longer, sometimes linear; petals rarely 6; plants mostly taller. PORTULACACEAE (p. 86)

CC. Leaves not entire.

G. Pistils more than 1.

H. Stamens on the receptacle; sepals distinct; stipules none.

RANUNCULACEAE (p. 95)

HH. Stamens on the calyx tube; sepals united at base; stipules present.

ROSACEAE (p. 125)

GG. Pistil only 1.

I. Leaves palmately veined; sepals distinct.

MALVACEAE (p. 150)

II. Leaves pinnately veined; sepals united at base.

J. Stipules adnate to the petiole; stamens 5-10; stigma 1.

Horkelia in ROSACEAE (p. 125)

JJ. Stipules none; stamens numerous; stigmas 3.

LOASACEAE (p. 155)

GROUP 18 — Dicotyledonous herbs with alternate simple leaves and polypetalous flowers with few stamens

- A. Peat bog plants; leaves all in a basal rosette, oblanceolate or spatulate, very conspicuously glandular-hairy, red or reddish green; leaf blades not over 2 cm. long.
DROSERACEAE (p. 116)
- AA. Not peat bog plants; leaves not as above in all characters.
- B. Two or more separate pistils to each flower.
- C. Leaves fleshy, pinnately veined or 1-veined; pistils the same in number as the sepals or the petals.
CRASSULACEAE (p. 117)
- CC. Leaves not fleshy, or if so, palmately veined; pistils only rarely the same in number as the petals or the sepals.
- D. Leaves either coriaceous and evergreen or else peltate; stamens 5-10, inserted on the calyx tube.
SAXIFRAGACEAE (p. 118)
- DD. Leaves not coriaceous and evergreen, not peltate; stamens rarely 5 or 10, inserted on the receptacle.
RANUNCULACEAE (p. 95)
- BB. Only 1 pistil to each flower.
- E. Leaves palmately veined.
- F. Plants with mustard or turnip taste; pod linear; sepals 4; petals 4; stamens 6.
CRUCIFERACEAE (p. 106)
- FF. Plants without mustard or turnip taste; pod not linear; sepals none or 5; petals 5; stamens 5 or 10.
- G. Flowers irregular; 1 petal spurred.
VIOLACEAE (p. 153)
- GG. Flowers regular or nearly so; petals not spurred.
- H. Petals on the receptacle; ovary superior, 5-celled; flowers not in umbels.
Geranium in GERANIACEAE (p. 143)
- HH. Petals on the calyx; ovary superior or half inferior, 1-2-celled; flowers not in umbels.
SAXIFRAGACEAE (p. 118)
- HHH. Petals on the ovary; ovary inferior, 2-celled; flowers in umbels.
UMBELLACEAE (p. 163)
- EE. Leaves pinnately veined.
- I. Ovary superior.
- J. Plants with mustard or turnip taste; sepals 4; petals 4; stamens 6.
CRUCIFERACEAE (p. 106)
- JJ. Plants without mustard or turnip taste; sepals and petals rarely 4; stamens rarely 6.
- K. Flowers regular or very nearly so, not spurred.
- L. Leaves basal, linear, 2.5-7.5 cm. long, somewhat thick or fleshy; flowers in a dense head, reddish; near the seashore.
PLUMBAGINACEAE (p. 178)
- LL. Leaves not as above in all characters; flowers not in a dense head.
- M. Sepals 2.
PORTULACACEAE (p. 86)
- MM. Sepals 3-8.
- N. Leaves coriaceous, evergreen, glabrous.
- O. Carpels 2-4; styles or sessile stigmas 2-4.
Saxifraga in SAXIFRAGACEAE (p. 118)
- OO. Carpels 5; style 1; stigmas 1 or 5.
PYROLACEAE (p. 169)
- NN. Leaves not coriaceous nor evergreen, often not glabrous.
- P. Leaves very fleshy.

- Q. Petals 5, yellow; sepals 5. CRASSULACEAE (p. 117)
 QQ. Petals usually not 5, white; sepals usually not 5. PORTULACACEAE (p. 86)
 PP. Leaves not fleshy.
 R. Flowers axillary; stem 5-angled. *Lythrum* in LYTHRACEAE (p. 156)
 RR. Flowers in clusters; stem terete.
 S. Stamens 5, on the receptacle; ovules 2 in each cell. LINACEAE (p. 144)
 SS. Stamens 10, on the calyx; ovules numerous. *Saxifraga* in SAXIFRAGACEAE (p. 118)
 KK. Flowers irregular.
 T. Flowers spurred at base. VIOLACEAE (p. 153)
 TT. Flowers not spurred at base.
 U. Leaves entire; petals 3; stamens 6-8; stigmas 1-2; style 1; carpels 2. POLYGALACEAE (p. 145)
 UU. Leaves serrate; petals 2 or 4; stamens 5; stigmas 5, sessile; carpels 5. BALSAMINACEAE (p. 148)
 II. Ovary inferior.
 V. Flowers in umbels or heads. UMBELLACEAE (p. 163)
 VV. Flowers neither in umbels nor in heads.
 W. Stem 5-angled; sepals and petals usually 6; flowers axillary. *Lythrum* in LYTHRACEAE (p. 156)
 WW. Stem terete; sepals and petals fewer; flowers usually clustered.
 X. Sepals 4; petals 4; stamens 2 or 4 or 8; style 1; stigmas 1 or 4. ONAGRACEAE (p. 156)
 XX. Sepals 5; petals 5; stamens 10; styles or sessile stigmas 2-4. *Saxifraga* in SAXIFRAGACEAE (p. 118)

GROUP 19 — Dicotyledonous herbs with alternate simple leaves and sympetalous flowers

- A. Ovary superior or mainly so.
 B. Corolla irregular.
 C. Leaves with stipules; corolla not 2-lipped; stamens 10. LEGUMINACEAE (p. 135)
 CC. Leaves without stipules; stamens 5 or fewer.
 D. Leaves all basal, on upper side greasy to touch; corolla spurred at base, 2-lipped; stamens 2. *Pinguicula* in PINGUICULACEAE (p. 210)
 DD. Leaves not all basal, not greasy to the touch; corolla not spurred; stamens 2 or 4 or 5.
 E. Corolla 2-lipped; ovary 1-2-celled. SCROPHULARIACEAE (p. 198)
 EE. Corolla not 2-lipped; ovary 5-celled. BALSAMINACEAE (p. 148)
 BB. Corolla regular or very nearly so.
 F. Plants twining; leaves none or scattered. CONVULVULACEAE (p. 182)
 FF. Plants not twining; leaves reniform, palmately veined, crenate, all basal. *Nephrophyllidium* in MENYANTHACEAE (p. 180)
 FFF. Plants not twining; leaves not reniform, not palmately veined, rarely crenate or all basal.
 G. Leaves fleshy-linear, 2.5-7.5 cm. long, all basal; flowers in dense heads; plants not far from the seashore. PLUMBAGINACEAE (p. 178)

- GG.** Either leaves not as above in all characters, or else flowers not in heads.
- H.** Leaves very fleshy; flowers in cymes, usually yellow.
CRASSULACEAE (p. 117)
- HH.** Leaves either not fleshy or else the flowers in long narrow spikes.
- I.** Leaves all basal; flowers in spikes; corolla scarious, veinless.
PLANTAGINACEAE (p. 210)
- II.** Either leaves not all basal or else the flowers not in spikes; corolla not scarious, veined.
- J.** Ovary deeply 2- or 4-lobed, maturing into 2 or 4 separate or separable nutlets.
BORAGINACEAE (p. 187)
- JJ.** Ovary not deeply lobed, not maturing into separate nor separable nutlets.
- K.** Style 3-cleft at apex; capsule 3-celled.
POLEMONIACEAE (p. 183)
- KK.** Styles or stigmas 1-2; capsule 1-2-celled.
- L.** Stamens opposite the corolla lobes; ovary 1-celled; placenta central; style 1; stigma capitate.
PRIMULACEAE (p. 175)
- LL.** Stamens alternate with the corolla lobes; often differing from the above in some of the other characters.
- M.** Corolla 20 mm. or more long.
SOLANACEAE (p. 196)
- MM.** Corolla 16 mm. or less long.
- N.** Fruit a berry; inflorescence not scorpid; style 1.
SOLANACEAE (p. 196)
- NN.** Fruit a capsule; inflorescence somewhat scorpid; styles often 2.
HYDROPHYLLACEAE (p. 185)
- AA.** Ovary inferior or mainly so.
- O.** Vine with tendrils.
CUCURBITACEAE (p. 216)
- OO.** Not a vine; tendrils none.
- P.** Flowers not in heads.
- Q.** Corolla regular; stamens distinct.
CAMPANULACEAE (p. 216)
- QQ.** Corolla irregular by not being equally split between the lobes; stamens united by their anthers.
LOBELIACEAE (p. 217)
- PP.** Flowers in heads.
COMPOSITACEAE (p. 218)

GYMNOSPERMS (CONE BEARERS)

TAXACEAE (YEW FAMILY)

Shrubs or trees; not resin-bearing, evergreen. Leaves linear, alternate, short-petioled, flat, blue-green, rather sharply pointed. Cones or flower-bunches very small. Staminate cones of a few scaly bracts. *Fruit a fleshy ring almost covering the one hard seed, becoming a red berry.* W. C. — (Gk. *toxon* = bow; referring to the use of the wood.)

Taxus brevifolia (WESTERN YEW)

PINACEAE (PINE FAMILY)

Shrubs or trees; resinous, mostly evergreen. Leaves either needles or scales. Ovules and pollen sacs in separate cones. Staminate cones consisting of 4 to many scales. *Pistillate cones consisting either of scales only, or of scales and bracts, usually dry and woody*, sometimes a bluish berry. *Scales bearing 1 to several ovules (usually 2) on the inner surface*, woody or papery or fleshy.

A. Leaves opposite or in whorls of 3, not sheathed when in 3's, scalelike (except sometimes in *Juniperus*); cone scales 12 or fewer, decussate.

B. Fruit, a bluish berry; leaves often awl-shaped, often scalelike, often both forms on the same plant.

JUNIPERUS (p. 30)

BB. Fruit a dry woody cone; leaves all scalelike.

C. Leaves 4 in a whorl; cone scales of 3 quite unlike pairs; seeds unequally 2-winged. U. C. — A fine lumber tree. (Gk. *leibo* = to pour out, *kedros* = the Cedar; probably on account of the strong cedar-like odor.)

Libocedrus decurrens (INCENSE CEDAR)

CC. Leaves opposite; cone scales alike or nearly so; seeds equally 2-winged.

D. Pistillate cones globose, their scales peltate; staminate cones oblong, their scales ovate and not peltate.

CHAMAECYPARIS (p. 30)

DD. Pistillate cones oblong, their scales not peltate; staminate cones globose, their scales peltate. W. C. E. — Our best tree for shingles. (Gk. *thuia* = the name of a similar tree.)

Thuja plicata (GIANT CEDAR)

AA. Leaves alternate or in bunches of 2 to many, sheathed at the base if in 2-5-leaved bunches, linear, not scalelike (except sometimes in *Sequoia*); cone scales more than 12.

E. Leaves of 2 forms; one form lanceolate, flat, 6-13 mm. long; the other form ovate or ovate-oblong, keeled, 5-7 mm. long; seeds 5-7 under each scale. U. — A fine lumber tree. (Honor of *Sequoyah*, the Indian name of George Guess, who invented the Cherokee alphabet.)

Sequoia sempervirens (REDWOOD)

EE. Leaves of only 1 form; seeds 2 under each scale.

F. Leaves solitary.

G. Branchlets not roughened by persistent leaf bases; bracts either longer than the cone scales, or else shorter and the cones erect and their scales dropping from the axis.

H. Leaves flat or 4-sided, often notched at apex; leaf scars circular; mature cones erect; scales dropping from the cone axis; bract usually shorter than the scales. **ABIES** (p. 31)

HH. Leaves flat, never notched at apex; leaf scars transversely oval; mature cone pendulous; scales persistent to the cone axis; bracts longer than the scales. **W. C. E.**—The most abundant lumber tree of the Northwest. (Gk. *pseudos* = false; Jap. *tsuga* = the Hemlock.)

Pseudotsuga taxifolia (DOUGLAS FIR)

GG. Branchlets roughened by persistent leaf-bases; bracts shorter than the cone scales; cone pendulous; cone scales persistent on the axis.

I. Leaves if flat with stomates below, with 1 dorsal resin duct; cone scales entire, rounded. **TSUGA** (p. 31)

II. Leaves if flat with stomates above, with 2 lateral resin ducts or none; cone scales not entire, or if so not rounded. **PICEA** (p. 32)

FF. Leaves in bunches of 2 or more.

J. Leaves in bunches of more than 5, deciduous; bunches not sheathed at base; cones solitary; pistillate cones maturing at the end of the first season.

LARIX (p. 32)

JJ. Leaves in bunches of 2–5, evergreen; bunches sheathed at base; staminate cones clustered; pistillate cones maturing at the end of the second or third season. **PINUS** (p. 32)

JUNIPERUS (JUNIPER)

Shrubs or trees. Leaves evergreen, sessile, awl-like or scalelike, opposite or in whorls of 3. Flower-bunches and berries small. Staminate flower-bunch oblong or ovoid; scales with 2–6 pollen sacs. Fruit a bluish berry, globose; pistillate scales few, opposite or in whorls of 3. Seeds 1–4, bony. — (Celtic name.)

A. Leaves in whorls of 3, all awl-shaped; buds scaly; cones axillary; pistillate cones with smaller scales at the tip; alpine shrub, prostrate, 1 m. or less tall. **W. C. E.**

J. communis (DWARF JUNIPER)

AA. Leaves opposite or in whorls of 3, often awl-shaped on young plants, but scale-like on mature plants; buds naked; cones terminal on short axillary branches; pistillate cones with larger scales at the tip; not alpine, erect, shrub or tree, 15 m. or less tall.

B. Leaves very resinous, dark green. **E.** **J. occidentalis** (WESTERN JUNIPER)

BB. Leaves not resinous, often glaucous. **W. E.**

J. scopulorum (ROCKY MOUNTAIN JUNIPER)

CHAMAECYPARIS

Trees. Leaves minute, 4-ranked. Cones small, monoecious, terminal. Staminate cone scales many, 4-ranked, with 2 pollen sacs. Pistillate cones

closed until mature; scales 4-12, opposite, thick, each with a central point or knob. Seeds 2-5. — (Gk. *chamai* = on the ground, *kuparissos* = a cypress; hence, low cypress.)

A. Leafy twigs terete or nearly so; bark 2 cm. or less thick; leaves usually without glands. W. C. — On mountains. **C. nootkatensis** (ALASKA CEDAR)

AA. Leafy twigs much flattened; bark 25 cm. or less thick; leaves conspicuously glandular. U. — A fine lumber tree. **C. lawsoniana** (PORT ORFORD CEDAR)

ABIES (FIR)

Trees. Leaves linear, often complanate, scattered, flat. Staminate cones axillary, oval or oblong-cylindric. Mature pistillate cones ovoid or oblong-cylindric; scales incurved at their wide apex, orbicular or wider, deciduous. — Lumber trees. (Latin name.)

A. Most of the leaves of the sterile branches notched at apex.

B. Bracts conspicuous, reflexed, much exceeding the scales; leaves slightly notched at apex, with stomates on both sides, not markedly complanate; winter buds ovoid-oblong; sapwood darker than heartwood. W. C. **A. nobilis** (NOBLE FIR)

BB. Bracts not projecting beyond the scales; leaves distinctly notched at apex, with stomates beneath only, markedly complanate; winter buds globose; sapwood lighter in color than heartwood. W. C. E. **A. grandis** (WHITE FIR)

AA. Most of the leaves of the sterile branches not notched at the apex.

C. Leaves of sterile branches flat, often grooved above; cones 6.2-15 cm. long; cone scales narrower than 2.5 cm.

D. Leaves dark-green and shining above, 1.9-3.1 cm. long; cones dark purple; cone scales slightly wider than long; bracts of cone scales rhombic or oblong-ovate, gradually narrowed into a long tip; bark of old trees 6.2 cm. or less thick. W. C. **A. amabilis** (LOVELY FIR)

DD. Leaves pale blue-green, 2.5-4.4 cm. long; cones dark purple; cone scales longer than wide; bracts of cone scales rounded, with emarginate and long-pointed tip; bark of old trees 3.7 cm. or less thick. W. C. E.

A. lasiocarpa (ALPINE FIR)

DDD. Leaves pale blue-green, 5-7.5 cm. long on vigorous sterile branches, while on others sometimes only 1.9 cm. long; cones purple or green or yellow; cone scales much wider than long; bracts of cone scales obovate, with short tip at apex; bark of old trees 15 cm. or less thick. U. C. E. **A. concolor** (SILVER FIR)

CC. Leaves of sterile branches 4-sided, not grooved above; cones 15-23 cm. long; cone scales 2.5-3.7 cm. wide. U. C. **A. magnifica** (SHASTA FIR)

TSUGA (HEMLOCK)

Trees. Leaves scattered, often complanate. Cones solitary, monoecious. Staminate cones globose. Mature pistillate cones oval to oblong-cylindric; scales thin, suborbicular to ovate-oblong. — (Japanese name.)

A. Leaves complanate, flat, with stomates only on the under surface; cones 1.9-2.5 cm. long. W. C. E. — A good lumber tree.

T. heterophylla (WESTERN HEMLOCK)

AA. Leaves not complanate, convex or keeled above, with stomates on both surfaces; cones 1.9-7.5 cm. long. W. C. E. — On mountains.

T. mertensiana (ALPINE HEMLOCK)

PICEA (SPRUCE)

Trees. Leaves mostly not complanate, 4-angled, scattered. Staminate cones oblong or oval or cylindric, long-stalked. Mature pistillate cones ovoid or oblong-cylindric. Scales thin, obtuse.—Good trees for lumber and paper. (Latin name.)

- A. Cone scales entire, broadly ovate, rounded at apex; leaves obtuse, somewhat flat; branchlets pubescent. U. *P. breweriana* (WEEPING SPRUCE)
- AA. Cone scales not entire, mostly contracted at both ends; leaves acute or acuminate, 4-sided or somewhat rounded.
- B. Branchlets pubescent; leaves 4-sided, with stomates on 4 sides; cones about 5 cm. long; cone scales gradually narrowed to an acute or truncate tip; crushed leaves with decided skunklike smell. C. E. *P. engelmanni* (ENGELMANN SPRUCE)
- BB. Branchlets glabrous; leaves hardly 4-sided, usually with stomates on the upper side only; cones 5-10 cm. long; cone scales rounded at tip; crushed leaves with little or no skunklike smell. W. *P. sitchensis* (SITKA SPRUCE)

LARIX (LARCH)

Trees with many knoblike branches on their twigs. Leaves 3-4-angled, some in bunches of 10 or more on the knoblike branches, others scattered on the elongated twigs. Staminate cones globose to oblong. Pistillate cones conical to subglobose; scales slightly thickened, suborbicular or oblong-ovate.—Lumber trees. (Celtic name.)

- A. Leaves 3-angled; branchlets and bud scales pubescent but soon become glabrous; cones 2.5-3.7 cm. long. C. E. *L. occidentalis* (WESTERN LARCH)
- AA. Leaves 4-angled; branchlets and bud scales tomentose; cones 3.7-5 cm. long. C. E. *L. lyallii* (WOOLLY LARCH)

PINUS (PINE)

Trees or shrubs. Staminate cones involucrate. Scales of pistillate cones thickened at tip, woody, tipped with a scar or protuberance.—Mostly lumber trees. (Latin name.)

- A. 2 leaves in a bunch.
- B. Leaves 2.5-7.5 cm. long, all in 2's; cones 1.5-5 cm. long, remaining on the trees for 5-30 years. W. C. E. *P. contorta* (LODGE-POLE PINE)
- BB. Leaves 10-27 cm. long, often some in 3's; cones 7.5-37.5 cm. long, dropping within 2 years. W. C. E. *P. ponderosa* (YELLOW PINE)
- AA. 3 leaves in a bunch.
- C. Leaves in 2's or 3's; cones subterminal, falling within 2 years. (See BB.)
- CC. Leaves all in 3's; cones lateral, remaining 2 to many years. C. *P. attenuata* (KNOB-CONE PINE)
- AAA. 5 leaves in a bunch.
- D. Cones 3.7-12.5 cm. long (in *P. flexilis* 7.5-25 cm.), their stalks 2-7 mm. long; cone scales with prickles, thick; seeds longer than their wings (except in *P. balfouriana*); leaves 2.5-7.5 cm. long; bark whitish where smooth.
- E. Leaves 2.5-3.7 cm. long, persistent for 10-12 years; old bark divided into isodiametric plates; cones 8.7-12.5 cm. long, opening at maturity; prickles of cone scales on back and not at very tip, pointing away from cone axis. U. *P. balfouriana* (FOXTAIL PINE)

- EE.** Leaves 3.7-6.2 cm. long, persistent for 5-8 years; old bark divided into elongated plates; cones 3.7-7.5 cm. long, not opening at maturity; prickles of cone scales at tip, pointing toward cone tip. C. **P. albicaulis** (WHITE-BARK PINE)
- EEE.** Leaves 3.7-7.5 cm. long, persistent for 5-6 years; old bark divided into isodiametric plates; cones 7.5-25 cm. long, opening at maturity; prickles of cone scales at very tip, pointing toward cone tip. C. E. **P. flexilis** (LIMBER PINE)
- DD.** Cones 15-45 cm. long, their stalks 12-75 mm. long; cone scales with obsolete prickles or none, thin; seeds shorter than their wings; leaves 3.7-10 cm. long; bark green where smooth (or whitish in *P. monticola*).
- F.** Cones 1.2-2.8 dm. long; seed $\frac{1}{2}$ as long as its wing; old bark 3.7 cm. or less thick, broken into isodiametric plates; smooth younger bark whitish. W. C. E. **P. monticola** (WESTERN WHITE PINE)
- FF.** Cones 3-4.5 dm. long; seed $\frac{1}{2}$ as long as its wing; old bark 7.5 cm. or less thick, broken into elongated plates; smooth younger bark greenish. C. **P. lambertiana** (SUGAR PINE)

ANGIOSPERMS (OVARY PLANTS)

MONOCOTYLEDONS

TYPHACEAE (CAT-TAIL FAMILY)

Perennial; roots fibrous; stems simple, terete. Leaves alternate, linear or strap-shaped, sheathing at base, flat, more or less convex on the back, parallel-veined. *Flowers in terminal spikes (cat-tails)*, the staminate above the pistillate. Staminate flowers among hairs; stamens 1-7. *Perianth of several delicate silky hairs*. Ovary stalked; style long. Seed 1. — Marsh plants. (Gk. *typha* = the cat-tail.) Only the following genus. (F. & R. p. 30.) **TYPHA** (CAT-TAIL)

SPARGANIACEAE (BUR-REED FAMILY)

Roots fibrous; stems erect or immersed and floating. Leaves linear, alternate, equitant below or flat, sheathing at base. *Flowers sessile or peduncled, in heads, staminate heads above the pistillate. Perianth of 3-6 chaffy scales*. Stamens mostly 5. Pistils 1, or 2 with united styles and ovaries. Seed 1. — Marsh plants. (Gk. *sparganon* = a band; referring to the ribbon-like leaves.) Only the following genus. (F. & R. p. 30.) **SPARGANIUM** (BUR-REED)

NAIADACEAE (PONDWEED FAMILY)

Aquatic or marsh herbs, mostly immersed, with rootstocks. Leaves alternate or opposite, sometimes all basal; blade rarely toothed or none; reduced leaves various in shape. Flowers perfect or unisexual, variously arranged. *Perianth none, or of 4-6 distinct segments, or membranous and tubular or cup-shaped*. Stamens 1-2 or 4-6. Ovary superior; carpels 1-6. — Family too difficult for beginners, hence key only to genera. (F. & R. pp. 31-34.)

- A. Growing in fresh water, or in salt marshes, but not in open tidewater.
- B. Leaves flat, or in a few species terete but then never more than 1.5 mm. in diameter; stem elongated.
- C. Leaves alternate, often wide, more than 25 mm. long when linear; pistil 1.
- D. Leaves all linear, all alternate; stamens 2; fruit stalked. — (Honor of H. B. Ruppius, a German botanist.) **Ruppia** (DITCH GRASS)

- DD. Often with some wide leaves, often the upper leaves opposite; stamens 4; fruit sessile. (Sec F.)
- CC. Leaves opposite or in whorls of 3, all linear, 8-25 mm. long; pistils more than 1.
- E. Leaves not spiny; pistils 2-10.
- F. Flowers perfect, in spikes or clusters; stamens more than 1. — (Gk. *potamos* = a river, *geiton* = a neighbor; from the habitat.)
Potamogeton (PONDWEED)
- FF. Flowers monoecious, axillary; stamen 1. E. — (Honor of G. G. Zannichelli, a botanist of Venice.) Zannichellia palustris (HORNED PONDWEED)
- EE. Leaves spiny on the margins or back or both; flowers solitary in the leaf axils; pistil 1. — (Gk. *naias* = a water nymph; from the habitat.)
Naias (WATER NYMPH)
- BB. Leaves terete, 1-4.5 mm. in diameter, all basal; stem not elongated. W. — (Meaning not determined.) Lilaea subulata
- AA. Growing along tide-water shores from 1 m. above low tide to 2 m. below it; not in salt marshes.
- G. Plants growing on muddy bottom; leaves 3-15 mm. wide. W. — (Gk. *zoster* = a belt; referring to the leaves.) Zostera marina (EEL-GRASS)
- GG. Plants growing mostly in rock crevices; leaves 4 mm. or less wide. — (Gk. *phyllon* = a leaf; + spadix; inflorescence inclosed in leaf base.)
Phyllospadix (SEA BASKET-GRASS)

JUNCAGINACEAE (ARROW-GRASS FAMILY)

Perennial *marsh herbs*. Leaves rushlike; blades terete or half terete at least near their base. Flowers perfect, in spikes or racemes. *Perianth* 3-6-parted, in 2 very similar series. Stamens 3-6, on the base of the perianth. Carpels 3-6, more or less united until maturity. Fruit a capsule or follicle. Seeds 1-2 in each carpel. — Difficult family. Key mostly only to genera. (F. & R. p. 34.)

- A. Leaves all basal; flowers many, bractless, in a spike or spikelike raceme; anthers oval; stigmas plumose. — (Gk. *treis* = 3, *glochis* = point; some species have 3-pointed fruits.) Triglochin (ARROW GRASS)

- AA. Stem leafy; flowers few, bracted, in loose racemes; anthers linear; stigmas papillose or slightly fimbriate. W. C. E. — (Honor of J. and J. J. Scheuchzer, Swiss botanists.) Scheuchzeria palustris

ALISMACEAE (WATER-PLANTAIN FAMILY)

Aquatic or *marsh herbs*, annual or perennial. Leaves basal; petiole long, sheathing at base; blade flat, several-ribbed, often with spreading or deflexed lobes. Scapes erect or floating. Flowers perfect or unisexual, regular, whorled, borne in terminal racemes or panicles. *Calyx* of 3 persistent green sepals. *Corolla* white

or pink, of 5 deciduous imbricate petals. Stamens 6 or more. Fruit a head or whorl of separate flat or turgid akenes. — Difficult family. Key only to genera. (F. & R. p. 35.)

A. Leaves not sagittate, although sometimes cordate at base; flowers in compound panicles, perfect; akenes in a whorl; receptacle depressed. — (*Celtic alis* = water; from the habitat.) **Alisma** (WATER PLANTAIN)

AA. Leaves sagittate; flowers in whorls or 3 near the top of the scape, monoecious or dioecious; akenes in a head; receptacle convex to globose. — (*L. sagitta* = an arrow; referring to leaf form.) **Sagittaria** (WAPATO)

HYDROCHARITACEAE (WATER-WEED FAMILY)

Perennial; *submerged*, with stem elongated. Leaves whorled, sessile, pellucid, 1-veined, oblong or ovate-oblong, usually obtuse, 5-10 mm. long, 2-4 mm. wide, margin usually minutely denticulate or serrulate. Flowers very rare. W. E. — Only the following species. (Gk. *phyllon* = a leaf, *treis* = 3; the leaves are often in 3's.) **Philotria canadensis** (WATER WEED)

GRAMINACEAE (GRASS FAMILY)

Herbs, annual or perennial; *stems terete*, usually hollow, their joints closed. Leaves sheathing, with scarious ring (ligule) where blade joins sheath; *sheath* usually *split* to base on side opposite the blade. Inflorescence various, but its elements composed of flower groups (spikelets) of 1 to many flowers. *Spikelets composed of 0-2 basal flowerless bracts* (glumes), *above which are other bracts usually in pairs* (the outer = lemma, the inner = palet) and *each pair inclosing a flower or an abortive one*. Lemma and glume often awned. Palet with back to axis (rachilla) of spikelet, opposite its lemma and often rolled up in it. Stamens 1-6, usually 3; *anthers versatile*. Styles 1-3, usually 2 and lateral; stigmas plumose or hairy. Fruit 1-seeded, *a grain*. — A difficult family. The key is to species usually only when of economic importance. (F. & R. pp. 36-74.)

A. Grain in corn-ear-like cluster.

MAYDEAE (p. 37)

AA. Grain not in corn-ear-like cluster.

B. Spikelets 1-flowered, rarely 2-flowered, terete or dorsally flattish (laterally in *Oryzae*); imperfect flower below in the 2-flowered spikelets.

C. Glumes 1-2; spikelets terete or dorsally flattened, 1-2-flowered.

D. Glumes indurated; lemma and palet of fertile flower hyaline; stamen 1.

ANDROPOGONEAE (p. 37)

DD. Glumes membranous; lemma and palet of fertile flower indurated; stamens 3.

PANICEAE (p. 38)

CC. Glumes none; spikelets much laterally flattened, 1-flowered.

ORYZAEAE (p. 38)

BB. Spikelets 1- to many-flowered, more or less laterally flattish; imperfect flower uppermost (except *Hierochloe*) in spikelets of 2 or more flowers.

E. Spikelets not in rows.

F. Spikelets 1-flowered, in racemes or spikes or panicles.

G. Spikelets with 2 sterile lemmas just above the glumes.

PHALAREAE (p. 38)

GG. Spikelets without sterile lemmas just above the glumes.

AGROSTAEAE (p. 38)

FF. Spikelets 2- to many-flowered, in racemes or panicles.

H. Glumes usually longer than the first flower; 1 or more of the lemmas awned on the back or between the teeth of the bifid apex. AVENEAE (p. 41)

HH. Glumes shorter than the first flower; lemma either awnless, or with 1 to several terminal straight or merely divergent awns. FESTUCEAE (p. 43)

EE. Spikelets in 2 rows.

I. Spikelet-rows on same side of rachis, forming 1-sided spikes.

CHLORIDEAE (p. 46)

II. Spikelet-rows on opposite sides of rachis, forming balanced spikes.

HORDEAE (p. 47)

MAYDEAE (Corn Tribe).—Stem solid. Spikelets unisexual. Staminate and pistillate flowers separate on the same plant. Lemma and palet thinner than the glumes. W. E. — (*L. zea* = spelt.) We have only the following.

Zea mays (COMMON FIELD-CORN)

ANDROPOGONEAE (Sugar-cane Tribe).—Spikelets 1-3 at each joint of the rachis, sessile or short-pedicelled, usually 3-flowered. Glumes 2, thicker than the lemmas. Lemma often hyaline, often awned, the lower often empty and glumelike. Palet usually shorter than its lemma, sometimes none. Stamens 1-3. Stigma plumose. Grain unfurrowed, free.—Here belongs also *Saccharum officinarum* (Sugar Cane).

A. Spikelets in a spikelike panicle, in 2's, all fertile; lemma awnless; stamens 1-2. E.

Imperata hookeri (WESTERN BLADE GRASS)

AA. Spikelets in a loose, somewhat spreading panicle, in 3's, lateral 2 sterile, central 1 fertile; lemma awned; stamens 3.

SORGHUM (p. 37)

SORGHUM

Plant 9-30 dm. high. Leaves long, wide, flat. Spikelets in a large terminal panicle, in pairs at its nodes or in 3's at the ends of its branches, 1 sessile and perfect at each node. Glumes shining. Lemma hyaline, awned. Palet hyaline or none. Stamens 3. W.—(*Sorghi* = the name in India.)

A. Cornlike, annual. E.—Cultivated for molasses.

S. vulgare (SORGHUM)

AA. Grasslike, perennial. W.—A hay grass.

S. halapense (JOHNSON GRASS)

PANICEAE (Millet Tribe). — Spikelets in spikes or racemes or panicles, falling off singly from the ultimate branches; fertile spikelet with 1 terminal pistillate flower, with or without a staminate one below it. Glumes rarely awned, the awn straight. Lemma and palet firmer than the glumes, unawned in most. Stamens 3, rarely fewer. Grain inclosed, free, unfurrowed.

A. Spikelets in 1-sided spikes or spikelike racemes.

B. Lemmas not awned; glumes not spiny-hispid, hence spikes or spikelike racemes not bristly.

C. Annual; lower glume very small; lemma with hyaline margin, not inrolled. W. E. — A bad weed in cultivated fields. (Gk. *syn* = with, *therismos* = crop; hence crop-making.) **Syntherisma sanguinale** (CRAB GRASS)

CC. Perennial; glumes equal or nearly so; lemmas without hyaline margin, inrolled. E. — (Gk. *paspalos* = millet.) **Paspalum distichum** (JOINT GRASS)

BB. Sterile lemma awned; glumes spiny-hispid, making the spikelike racemes somewhat bristly. W. E. — (Gk. *echinos* = a hedgehog, *chloa* = grass; referring to the bristling awns.) **Echinochloa crusgalli** (BARNYARD GRASS)

AA. Spikelets in open panicles, or if in a spikelike panicle this not 1-sided.

D. Spikelets without an involucre of bristles, in an open panicle. — (Latin name of the Italian Millet.) **Panicum** (PANIC GRASS)

DD. Spikelets with an involucre of bristles, clustered in a single dense terminal spikelike panicle. W. E. — (Gk. *chaeta* = a bristle, *chloa* = grass; referring to the bristly spikes.) **Chaetochloa viridis** (GREEN FOXTAIL)

ORYZAE (Rice Tribe). — Perennial. Spikelets laterally flat, in a loose panicle, with 1 terminal unisexual or perfect flower inclosed by a lemma and a palet; lemma boat-shaped, awnless, clasping the palet by a pair of strong marginal veins, palet 1-veined. Glumes none. Stamens 3. Grain furrowed. — *Oryza sativa*, cultivated rice, is in this tribe. Only the following species. W. E. — (Gk. *omalos* = resemblance, *kenchros* = millet; hence millet-like.) **Homalocenchrus oryzoides** (RICE CUT-GRASS)

PHALAREAE (Canary-grass Tribe). — Leaf blades flat. Spikelets of 1 perfect flower with 2 sterile or staminate lemmas below it and falling attached to it. Palet 0-2-veined, inclosed in fertile lemma. Stamens 2-3. Stigmas plumose. Grain unfurrowed, inclosed, free.

A. Spikelets in spikelike or headlike clusters.

B. Glumes equal; sterile lemmas awnless; stamens 3; plant not sweet-scented. — (Gk. *phalaros* = brilliant; referring to the shining seed.) **Phalaris** (CANARY GRASS)

BB. Glumes unequal, lower about $\frac{1}{2}$ the upper; sterile lemmas awned; stamens 2; plant markedly sweet-scented. W. — (Gk. *anthos* = a flower, *xanthos* = yellow.) **Anthoxanthium odoratum** (SWEET VERNAL GRASS)

AA. Spikelets in loose panicles.

C. Plant not sweet-scented; spikelets 1-flowered; sterile lemmas subulate. (See B.)

CC. Plants strongly sweet-scented; spikelets 3-flowered, the lower 2 flowers staminate; staminate lemmas boat-shaped. — (Gk. *hieros* = holy, *chloe* = grass; in Europe strewn before church doors on saints' days.) **Hierochloe** (HOLY GRASS)

AGROSTEAE (Timothy Tribe). — Spikelets with 1 perfect flower. Rachilla sometimes prolonged beyond the palets into a naked or plumose

bristle. Glumes 2 (none in *Coleanthus*), subequal or unequal, usually as long as the lemma or longer. Palet veinless or 2-veined, but 1-veined in *Cinna* and wanting in some species of *Agrostis*. Grain unfurrowed.

A. Plants 2-8 cm. high; glumes none; spikelets hardly 1 mm. long. W. — (Gk. *koleos* = a sheath, *anthos* = a flower; inflorescence much inclosed in upper leaf.)

Coleanthus subtilis (MOSS GRASS)

AA. Plants taller; glumes present; spikelets longer.

B. Inflorescence a dense spikelike (Timothy-like) cluster.

C. Lower glume 4-6 times as long as the lemma not considering awn, and at least a half longer than the upper glume; glumes awnless; lemma-awn terminal, 3-5 mm. long. U. — (Gk. *gastros* = stomach, *eidos* = like; glume is swollen at base.)

Gastridium lendigerum (NIT GRASS)

CC. Not as above in all characters.

D. Lemma with a terminal awn 0.5-10 mm. long.

E. Lemma with a tuft of hair at base as long as the lemma. — (Honor of H. Muhlenberg, an American botanist.)

Muhlenbergia (DROPSEED)

EE. Lemma without a tuft of hair at base. — (Gk. *polys* = many, *pogon* = beard.)

Polypogon (BEARD GRASS)

DD. Lemma awnless or with a dorsal awn.

F. Lemma with a tuft of hair at base. — (Gk. *kalamos* = a reed, *agrostis* = a grass.)

Calamagrostis (REED GRASS)

FF. Lemma without a tuft of hair at base, though often ciliate on the keel.

G. Glumes not conspicuously compressed-keeled; inflorescence distinctly lobed and raceme-like. — (Gk. *agros* = a field; from the habitat.)

Agrostis (BENT GRASS)

GG. Glumes conspicuously compressed-keeled; inflorescence a dense terete spike not or hardly lobed.

H. Lemma with a dorsal awn 2-16 mm. long; glumes united for $\frac{1}{2}$ - $\frac{1}{3}$ their length at base. — (Gk. *alopex* = a fox, *oura* = a tail; referring to the spike.)

Alopecurus (FOXTAIL GRASS)

HH. Lemma awnless; glumes not united.

PHLEUM (p. 41)

BB. Inflorescence either plainly a panicle or if spikelike the spikelets distant, and thus the spike not dense.

I. Lemma with a terminal awn 0.3-20 cm. long; glumes sometimes awned.

J. Lemma of fertile flower thin, membranous. (See E.)

JJ. Lemma of fertile flower firm, hardened.

K. Lemma awn 3-branched. — (L. *arista* = an awn.)

Aristida (3-AWNED GRASS)

KK. Lemma awn not branched.

L. Lemma awn twisted, persistent.

STIPA (p. 40)

LL. Lemma awn not twisted, deciduous.

ORYZOPSIS (p. 40)

II. Lemma awnless or with a dorsal awn 1.2 cm. or less long; glumes awnless.

M. Lemma with a tuft of hair at base.

N. Glumes with awns 2-5 mm. long, about equal; lemma 3-veined. (See E.)

NN. Glumes awnless.

O. Lemma 1-veined; lower glume $\frac{1}{2}$ - $\frac{2}{3}$ as long as the upper. E. — (Gk. *kalamos* = a reed; *Vilfa* = another genus of grasses; hence a reedlike *Vilfa*.)

Calamovilfa longifolia (SAND GRASS)

OO. Lemma 5-veined; lower glume $\frac{1}{2}$ to equaling the upper. (See F.)

MM. Lemma without hairs at base.

P. Palet half as long as its lemma or shorter, often none; glumes exceeding the lemma; stamens 3. (See G.)

PP. Palet over half as long as its lemma; glumes not exceeding the lemma (except in *Cinna latifolia*).

Q. Seed tightly inclosed by the ovary; stamen 1; lemma with a very small dorsal awn. — (Gk. *kinna* = some kind of a grass.) **Cinna** (INDIAN REED)

QQ. Seed loosely inclosed by the ovary; stamens 2-3; lemma awnless. — (Gk. *spora* = a seed, *ballein* = to cast forth; the grain is deciduous.)

Sporobolus (DROPSEED)

STIPA (NEEDLE GRASS)

Perennial, tufted. Leaves often rolled up. Spikelets in a terminal panicle. Glumes persistent, keeled, unawned or rarely with a slender awn. Lemma narrow, rigid, convolute, with callus at base, awned; callus bearded; awn terminal, twisted, geniculate. Palet 2-veined. Stamens 3. Grain cylindric, included, often burying itself in the soil by the twisting and untwisting of the awn. — In dry soil. Range grasses. (Gk. *stupe* = tow; from the towlike plumes of some species.)

A. Awn 7.5-20 cm. long.

B. Glumes 20-30 mm. long including the point, 5-veined; lemma without crown of hairs at apex. E. **S. comata** (NEEDLE GRASS)

BB. Glumes 16-20 mm. long, 3-veined; lemma with crown of hairs at apex. E. **S. setigera** (BEAR GRASS)

AA. Awn 5 cm. or less long.

C. Awn only slightly pubescent or scabrous.

D. Callus acute or acuminate, about 1 mm. long.

E. Panicle 15-25 cm. long; lemma and its callus 6-7 mm. long; palet $\frac{1}{2}$ as long as the lemma.

F. Sheaths smooth; awn 3.5-6 cm. long. E.

S. nelsoni

FF. At least the lower sheaths pubescent; awn 2-3 cm. long. E. **S. williamsii**

EE. Panicle 5-12 cm. long; lemma and its callus about 4 mm. long; palet $\frac{1}{2}$ as long as the lemma. W. C. E. **S. columbiana**

DD. Callus obtuse, very short. E.

S. lemmonii

CC. Awn plumose.

G. Ligule 1 mm. long or less.

H. Sheaths pubescent.

I. Awn smooth or rough but not pubescent. E.

S. viridula (FEATHER NEEDLE GRASS)

II. Awn pubescent to the second bend. E.

S. elmeri

HH. Sheaths glabrous. E.

S. occidentalis (WESTERN NEEDLE GRASS)

GG. Ligule 2-4 mm. long. E.

S. thurberiana

ORYZOPSIS (MOUNTAIN RICE)

Perennial, tufted. Spikelets in a narrow lax few-flowered panicle; rachilla not prolonged beyond the palet. Glumes persistent, convex on the back, obtuse or abruptly acute. Lemma wide, obtuse-truncate, terminating in an awn; awn deciduous, simple, more or less bent near the base. Palet 2-keeled. Stamens 3. Grain oblong-ellipsoid, free. — (Gk. *oryza* = rice, *opsis* = form.)

A. Lemma densely covered with conspicuous long white hairs; panicle loose; not alpine.

B. Leaf blade smooth; lemma narrowly elliptic; awn 8-12 mm. long. E.

O. bloomeri

- BB. Leaf blade scabrous; lemma broadly oval; awn 3-5 mm. long. E. — A good range grass. *O. cuspidata* (INDIAN MILLET)
- AA. Lemma hairs when present not dense nor conspicuous; panicle narrow (except *O. kingii*); alpine (except *O. kingii*). C. E.
- C. Awn of lemma 3-4 mm. long. C. E. *O. exigua* (SMALL MOUNTAIN RICE)
- CC. Awn of lemma 10-15 mm. long.
- D. Alpine; rays of panicle bearing 2-4 spikelets each; lemma smooth. E. *O. hendersoni*
- DD. Not alpine; rays of panicle bearing 1-2 spikelets each; lemma with short hairs on lower half. E. *O. kingii*

PHLEUM (TIMOTHY)

Perennial, erect. Leaf blades flat. Spikelets flat, in a dense cylindric or ovoid spike. Glumes almost equal, membranous, compressed-keeled, 1-3-veined, abruptly pointed, the keel projecting as a point or awn. Lemma shorter and wider than the glumes, thin, hyaline, truncate or denticulate, awnless, 5-veined, inclosing the palet. Palet nearly equaling the lemma, narrow, hyaline. Stamens 3. Grain ovoid, free. — (Gk. *phleos* = some kind of reed.)

- A. Spikes 1.5-3 cm. long; awn of glume 2 mm. long; plant 2-6 dm. high. W. C. E. *P. alpinum* (MOUNTAIN TIMOTHY)
- AA. Spikes 3-17 cm. long; awn of glume 1 mm. long; plant 4-10 dm. high. W. E. — One of the best and most common hay grasses. *P. pratense* (TIMOTHY)

AVENEAE (Oats Tribe). — Spikelets in either open or spikelike panicles, 2 to several flowered. Rachilla produced beyond the upper lemma (except in *Aira*). Glumes 2. Lemma with tuft of hair at base, some in each spikelet awned (except *Trisetum muticum*); awn either dorsal or near the apex between the lobes. Palet 2-keeled. Stigmas plumose.

- A. Plants 2 dm. high or less; spikelets 2-flowered, both perfect; rachilla jointed below the glumes, not prolonged beyond the upper flower. — (Gk. *aira* = a deadly weapon; applied to a poisonous Darnel.) *Aira* (HAIR GRASS)
- AA. Plants mostly taller; spikelets 2- to several-flowered, sometimes only 1 perfect when only 2; rachilla jointed above the glumes (except in *Holcus*), prolonged beyond the upper flower.
- B. Plants densely soft-whitish-hairy; spikelets falling off entire; rachilla jointed below the glumes; spikelets 2-flowered, the lower perfect, the upper staminate; awn of second flower hooklike. W. E. — A common grass especially west of the Cascades, often cut for hay. It often crowds out other and better hay grasses and then becomes a weed. Sometimes wrongly called "Mesquite." (Gk. *holkos* = some kind of grass.) *Holcus lanatus* (VELVET GRASS)
- BB. Plants not densely soft-whitish-hairy; spikelets falling off in parts; rachilla jointed above the glumes; spikelets 2- to several-flowered (2 only in *Arrhenatherum*, which has the perfect flower above); awns not hooklike.
- C. Spikelets 1 cm. long or less.
- D. Spikelets 8-10 mm. long; lemma awned from near the base; spikelets only 2-flowered; upper flower perfect or pistillate, the lower staminate. W. — (Gk. *arren* = masculine, *ather* = an awn; only the staminate flowers are awned.) *Arrhenatherum elatius* (TALL OAT-GRASS)

DD. Spikelets either less than 7 mm. long or else lemma awned from the middle or above it; spikelets 2 to many flowered; upper flower sometimes staminate or abortive, the others perfect.

E. Lemma keeled, obtuse or truncate, erose at tip, awn arising at or below the middle. **DESCHAMPSIA** (p. 42)

EE. Lemma convex, acute or shortly bifid, not erose, awn none or arising above the middle. **TRisetum** (p. 42)

CC. Spikelets over 1 cm. long.

F. Perennial; awn of lemma between the teeth at apex; grain glabrous.

DANTHONIA (p. 43)

FF. Annual or perennial; awn of lemma dorsal; grain hairy. **AVENA** (p. 43)

DESCHAMPSIA (HAIR GRASS)

Tufted. Spikelets 2-3-flowered, shining, in a terminal panicle. Glumes keeled, the sides thinly scarious. Lemma membranous or nearly hyaline, 4-veined, obtuse or truncate, 2-4 toothed, awned; awn fine, dorsal, arising at or below the middle. — (Honor of J. C. A. Loiseleur-Deslongchamps, a French botanist.) The 1st and 2d are good range grasses.

A. Some of the flowers projecting beyond the glumes; awn very slightly or not at all projecting beyond its lemma. **W. E.** **D. caespitosa** (TUFTED HAIR-GRASS)

AA. Flowers not projecting beyond the glumes; awn projecting beyond its lemma once the lemma length or more.

B. Perennial; glumes 3-6 mm. long; awn either less than 6 mm. long or straight, or both.

C. Leaf blade flat; awn hardly or not at all projecting beyond the glumes; glumes 1-veined, 4.5-6 mm. long; plants 1.5-4 dm. high. **W. C. E.**

D. atropurpurea (MOUNTAIN HAIR-GRASS)

CC. Leaf blade rolled up; awn projecting beyond the glume at least $\frac{1}{2}$ the glume length; glumes 3-veined, 3-4 mm. long; plants 3-12 dm. high. **W. C. E.**

D. elongata (SLENDER HAIR-GRASS)

BB. Annual; glumes 6-8 mm. long; awn 6-12 mm. long, geniculate. **E.**

D. calycina (OAT-LIKE HAIR-GRASS)

TRisetum (FALSE OAT)

Perennial, tufted. Spikelets 2-5-flowered, in a panicle. Glumes keeled, the first the shorter, the second nearly as long as the spikelet. Lemma keeled, acute or shortly bifid, awned; awn attached above the middle, dorsal or at the base of the cleft (sometimes none in *T. muticum*), usually twisted at base and more or less bent. Grain smooth, unfurrowed, inclosed, free. — (*L. tres* = 3, *sela* = a bristle; lemma has 1 awn and 2 sharp teeth.) The 3rd and 5th are good forage grasses.

A. Glumes almost equal; lemma acute, awnless or with awn about 1 mm. long or less.

B. Glumes 6-7 mm. long; spikelets 3-flowered. **E.**

T. muticum (BEARDLESS FALSE OAT)

BB. Glumes 3-5 mm. long; spikelets 2-flowered. **E.**

T. wolfil (WOLF'S FALSE OAT)

AA. Glumes unequal, the first $\frac{3}{4}$ - $\frac{1}{2}$ as long as the second; lemma cleft at apex, awn 4-12 mm. long.

- C. Panicle dense, 5-12 cm. long; plant 1.5-6 dm. high; spikelets 5-6 mm. long.
W. C. E. *T. spicatum* (NARROW FALSE OAT)
- CC. Panicle not dense, 12-20 cm. long; plants 3-12 dm. high; spikelets 6-8 mm. long.
D. Leaf sheath glabrous; lemma 5-6 mm. long, awn arising below the cleft.
W. C. E. *T. cernuum* (NODDING FALSE OAT)
- DD. Leaf sheath pubescent; lemma 6-7 mm. long, awn arising at the cleft.
W. C. E. *T. canescens* (SILVERY FALSE OAT)

DANTHONIA (OAT-GRASS)

Spikelets solitary or in a raceme or panicle. Glumes narrow, keeled, acute, awnless, usually as long as the spikelet. Lemma rounded on the back, awned, with 2 firm scarious terminal lobes; awn twisted, bent, arising between the lobes. Grain glabrous, free. — (Honor of Etienne Danthoine, a French botanist.) The 1st and 3rd are good range grasses.

- A. Spikelets in a narrow close panicle, ascending.
- B. Callus elongate, densely hairy. W. C. E. *D. intermedia* (SMALLER OAT-GRASS)
- BB. Callus very short, with a few short hairs. W. E. *D. pinetorum*
- AA. Spikelets solitary or spreading in a loose panicle.
- C. Spikelets 3-10; leaf sheath only slightly hairy; apex of lemma with 2 teeth 2-3 mm. long. E. *D. californica* (CALIFORNIA OAT-GRASS)
- CC. Spikelets 1-4; leaf sheath quite hairy; apex of lemma with 2 awl-like teeth 3-10 mm. long.
- D. Spikelets usually 2-4; lemma abruptly narrowed, 6-8 mm. long. W. C. *D. americana*
- DD. Spikelets usually only 1; lemma not abruptly narrowed, 8-10 mm. long. E. *D. unispicata* (MOUNTAIN OAT-GRASS)

AVENA (OATS)

Annual or perennial. Spikelets few-flowered, rarely 1-flowered, in a loose panicle; rachilla hairy under the lemma. Glumes scarious at least at the apex, lanceolate, nearly equal. Lemma smaller than the glumes, rounded on the back, 5-11-veined, 2-cleft at the apex, awned; awn dorsal, twisted. Palet narrow, 2-toothed. Stamens 3. Grain deeply grooved. — (The Latin name.)

- A. Lemma awn 2-4 cm. long, abruptly bent near the middle, arising near middle of lemma. W. E. — Sometimes cut for hay. *A. fatua* (WILD OATS)
- AA. Lemma awn 2 cm. or less long, not or hardly abruptly bent, arising $\frac{3}{4}$ way up lemma.
- B. Annual; spikelets 20-25 mm. long, 2-3-flowered; glumes 9-11-veined. W. E. — This is common cultivated oats, one of our best grain crops. *A. sativa* (OATS)
- BB. Perennial; spikelets 10-15 mm. long, 3-6-flowered; glumes 3-5-veined. E. *A. striata* (PERENNIAL OATS)

FESTUCEAE (Blue-grass Tribe). — Inflorescence a panicle, spikelike or spreading. Spikelets 2- to many-flowered, very rarely 1-flowered; glumes keeled, acuminate to obtuse, shorter than the first lemma. Lemma entire to 3-cleft, awnless; awns terminal, rarely dorsal. Palet 2-keeled.

- A. Lemma with 1-3 veins.
- B. Rachilla with long hairs which exceed the lemma in length; plants tall, reedlike.
E. — (Gk. *phragmites* = growing in hedges; referring to its hedgelike growth along ditches.) **Phragmites communis** (REED)
- BB. Rachilla glabrous or with short hairs which do not equal the lemma in length; plants not reedlike.
- C. Plant 1-2 dm. high; stems dichotomously branched; leaves crowded in dense tufts at the nodes or ends of the stems; stigma with short hairs on all sides. E. — (Honor of Gen. William Munro, an English agrostologist.)
Munroa squarrosa (FALSE BUFFALO-GRASS)
- CC. Most species taller; stems not dichotomously branched; leaves not in dense tufts along the stem; stigma plumose.
- D. Glumes nearly equal in length, but very unlike in form, the first narrowly linear and 1-veined, the second broadly obovate and obtuse and 3-veined. — (Honor of Amos Eaton, an American botanist.) **Eatonia**
- DD. Glumes unequal in length, but similar in form.
- E. Lemmas acute or awned, the veins converging in the tip. W. E. — A good range grass. (Honor of G. L. Koeler, a German botanist.)
Koeleria cristata (JUNE GRASS)
- EE. Lemma obtuse, the veins parallel and not converging in the tip.
- F. Panicle narrow; spikelets 3-50-flowered; rachilla not jointed; lemma deciduous; palet persistent. — (Gk. *er* = spring, *agrostis* = a grass.)
Eragrostis (MEADOW GRASS)
- FF. Panicle open; spikelets 2-flowered; rachilla jointed; lemma and palet both deciduous. E. — (Gk. *katabrosis* = an eating; because glumes and lemma have margins roughened as if gnawed.)
Catabrosa aquatica (WATER WHORL-GRASS)
- AA. Lemma with 5 or more veins.
- G. Spikelets nearly sessile, in dense 1-sided clusters at the ends of the few panicle branches. W. E. — A very good early range grass. (Gk. *dactylos* = a finger; referring to the thick spreading panicle branches.)
Dactylis glomerata (ORCHARD GRASS)
- GG. Spikelets not in dense 1-sided clusters at the ends of the panicle branches.
- H. Spikelets as wide as long, somewhat heart-shaped. U. — (Gk. *briza* = a grain similar to rye.) **Briza minor** (QUAKING GRASS)
- HH. Spikelets much longer than wide, not heart-shaped.
- I. Keels of the palet with a distinct crest or winglike appendage. — (Gk. *pleuron* = side, *pogon* = beard; referring to the ciliate keels of the palet.)
Pleuropogon (PLEUROPOGON)
- II. Keels of the palet not winged.
- J. Lemma somewhat keeled on the back.
- K. Lemma 2-toothed at apex, very rarely awnless; stigma arising below apex of ovary. **BROMUS** (p. 46)
- KK. Lemma acute or obtuse, not 2-toothed, not awned; stigma arising at apex of ovary.
- L. Glumes with 1-3 veins. **POA** (p. 45)
- LL. Glumes with 5 or more veins; salt-marsh plant. W. E. — (Gk. *distichos* = 2-ranked; referring to the flattish inflorescence.)
Distichlis spicata (SALT GRASS)
- JJ. Lemma rounded on the back, not at all keeled.
- M. Upper lemmas of spikelet sterile, club-shaped or hooded. — (L. *mel* = honey; it was formerly the name of *Sorghum* which has a sweet pith.)
Melica (MELIC GRASS)
- MM. Upper lemmas of spikelet either perfect, or else narrow and abortive but not club-shaped nor hooded.

N. Lemma 2-toothed at apex, mostly awned from just below the apex; stigmas arising below apex of ovary. **BROMUS** (p. 46)

NN. Lemma not 2-toothed at apex; lemma awn none or at the very apex; stigmas arising at apex of ovary.

O. Lemma acute, often awned, not scarious at apex; lemma veins not prominent. **FESTUCA** (p. 45)

OO. Lemma obtuse, awnless, scarious at tip.

P. Lemma prominently 5-9-veined; style present; lodicules united. — (Gk. *glykeros* = sweet; referring to the taste of the grain.)

Glyceria (MANNA GRASS)

PP. Lemma obscurely 3-veined; style none; lodicules separate. — (Honor of B. Puccinelli, an Italian botanist.) **Puccinellia** (SPEAR GRASS)

POA (BLUE-GRASS)

Spikelets 2-10-flowered; panicle usually loose and spreading, rarely narrow and spikelike. Glumes acute or obtuse. Lemma delicately scarious-margined, mostly scarious-tipped, usually surrounded by a few woolly hairs. Palet 2-toothed. — (Gk. *poa* = grass, or fodder in general.) A very difficult and numerous genus. Only 7 of the most useful ones are given, and the key separates only those. (F. & R. pp. 57-61.)

The wild ones are range grasses.

A. Lemma with long spider-weblike hairs at base.

B. Stem flat, 2-edged; panicle 1-4 cm. long, flat; lower glume 3-veined. **W. E.**
— A common lawn grass. **P. compressa** (CANADA BLUE-GRASS)

BB. Stem terete; panicle 5-10 cm. long, not flat; lower glume 1-veined. **W. C. E.**
— Common pasture and lawn grass. **P. pratensis** (KENTUCKY BLUE-GRASS)

AA. Lemma without spider-weblike hairs at base.

C. Lower glume 1-veined. **E.** **P. sandbergii**

CC. Lower glume 3-veined.

D. Stems coarse, 6-10 dm. high; plant glaucous.

E. Leaves rolled up; glumes and lemmas unequal. **E.** **P. laevigata**

EE. Leaves flat or folded; glumes and lemmas nearly or quite the same length.
E. **P. nevadensis** (NEVADA BLUE-GRASS)

DD. Stem not coarse, 2-7 dm. high.

F. Panicle loose, its branches spreading or ascending. **E.** **P. wheeler**

FF. Panicle dense, its branches erect or very short.

P. buckleyana (BUNCH REDTOP)

FESTUCA (FESCUE)

Spikelets 2- to many-flowered, in racemes or panicles; flowers perfect or the upper one staminate. Glumes keeled, equal or unequal, the lower 1-3-veined, the upper 3-5-veined. Lemma 5-veined. Stamens 1-3. Grain glabrous. — (L. *festuca* = a stalk or straw; hence applied to a straw-like grass growing in barley.) Mostly range grasses. Only 6 of the most important are given, and the key separates only those. (F. & R. pp. 62-64.)

A. Annual; stamens 1 or 2.

B. Spikelets 8-13-flowered.

F. octoflora (SLENDER FESCUE)

BB. Spikelets 1-4-flowered.

F. microstachys (SMALL FESCUE)

AA. Perennial; stamens 3.

- C. Awn as long as the lemma or longer. (See E.)
 CC. Awn shorter than the lemma or none.
 D. Leaves narrow, involute; plants usually tufted.
 E. Leaf blades quite smooth; young shoots arising outside the leaf sheath. **F. rubra** (RED FESCUE)
 EE. Leaf blades scabrous at margin or in their upper portion; young shoots arising within the leaf sheath.
 F. Panicle rays not cushioned at base; spikelets 5-7.5 mm. long; lemma 3-3.5 mm. long. **F. ovina** (SHEEP FESCUE)
 FF. Panicle rays cushioned at base; spikelets 8-12 mm. long; lemma 6-7 mm. long. **F. viridula**
 DD. Leaves flat, wide; plants not densely tufted. **F. elatior** (TALL FESCUE)

BROMUS (BROME)

Leaves flat or nearly so. Spikelets many, 5-15-flowered; glumes unequal, acute, the lower 1-3-veined, the upper 3-9-veined. Lemma 5-9-veined, awnless or awned from just below the tip. Palea keels ciliate. Stamens 3. Stigmas arising below the hairy cushionlike top of the ovary. Grain adherent. — (Gk. *broma* = food; *Bromus* was first the name of a wild oat.) A large genus of forage grasses of which only 10 of the most important are given, and the key separates only those. (F. & R. pp. 65-67.)

- A. Lemma awn 0-16 mm. long.
 B. Lemma glabrous or merely scabrous.
 C. Spikelets strongly flattened.
 D. Lemma 6-8 mm. long; glumes scabrous toward the apex. W. E. — Becomes a weed in wheat. **B. secalinus** (CHESS)
 DD. Lemma 14-16 mm. long; glumes smooth. (See HH.)
 CC. Spikelets terete or nearly so.
 E. Leaf sheath glabrous. W. E. **B. inermis** (HUNGARIAN BROME)
 EE. Leaf sheath pubescent.
 F. Panicle dense, erect. (See I.)
 FF. Panicle loose, spreading. W. E. **B. racemosus** (UPRIGHT CHESS)
 BB. Lemma hairy.
 G. Spikelets much flattened.
 H. Lemma awn 0-7 mm. long. W. E. **B. marginatus**
 HH. Lemma awn more than 7 mm. long. W. E. **B. carinatus**
 GG. Spikelets terete or nearly so.
 I. Lemma awn 6-8 mm. long; lower glume 3-veined. W. E. **B. hordeaceus** (SOFT BROME)
 II. Lemma awn 10-16 mm. long; lower glume 1-veined.
 J. Annual; leaves and sheaths pubescent; lemma 5-veined. E. **B. tectorum** (DOWNY BROME)
 JJ. Perennial; leaves and sheaths glabrous or pilose; lemma 7-veined. W. C. E. **B. eximus**
 AA. Lemma awn 17-25 mm. long. W. E. **B. sterilis**
 AAA. Lemma awn 35-65 mm. long. W. E. **B. maximus**

CHLORIDEAE (Bermuda-grass Tribe). — Spikelets 1- to several-flowered, in spikes or racemes; spikes 1-sided, digitately or racemosely arranged, rarely solitary. Lemma usually keeled, either entire and unawned or else toothed and with 1-3 straight awns. Grain unfurrowed, free.

- A. Spikelets 6-14 mm. long; lower glume about $\frac{1}{2}$ as long as the upper including awn-point if present.
- B. Plants 3-18 dm. high; lemma obtuse or emarginate, not awn-pointed, 1-veined, no sterile lemma above the first flower. — (Gk. *spartine* = a cord; referring to the tough slender leaves.) **Spartina** (CORD GRASS)
- BB. Plants 1.5-4.5 dm. high; lemma 3-pointed, each point with a short awn, 3-5-veined, with 1-3 sterile lemmas above the first flower. E. — (Honor of C. Boutelou, a Spanish agriculturist.) **Bouteloua oligostachya** (GRAMA GRASS)
- AA. Spikelets 2-4 mm. long; lower glume $\frac{2}{3}$ to once as long as the upper.
- C. Spikes all or nearly all from the tip, widely spreading when mature; rachilla jointed above the glumes.
- D. Perennial; spikelets 1-flowered, 2 mm. long. W. E. — An excellent pasture grass, but a weed in fields. (Gk. *kyon* = a dog, *odons* = a tooth; the 1-sided spike suggested a row of dog teeth.) **Cynodon dactylon** (BERMUDA GRASS)
- DD. Annual; spikelets several-flowered, 3-4 mm. long. W. E. — (Ceres, the Greek goddess of the harvests, was worshiped in the town of Elusin.) **Eleusine indica** (YARD GRASS)
- CC. Spikes scattered along a common axis, rather closely applied to this axis; rachilla jointed below the glumes. E. — (Honor of J. Beckmann, a German botanist.) **Beckmannia erucaeformis** (SLOUGH GRASS)

HORDEAE (Barley Tribe). — Leaf blade with a more or less well-marked pair of auriculate appendages at the base. Inflorescence a spike, with 1 or more spikelets at each joint of the rachis; rachis zigzagged, channeled. Spikelets sessile in the alternate notches of the rachis, 1- to many-flowered. Glumes awnless or awned or none.

- A. Spikelets solitary at each joint of the rachis.
- B. Spikes 4 mm. or less wide; spikelets 1-flowered. U. C. — (Honor of F. Lamson-Scribner, an American agrostologist.) **Scribneria bolanderi** (THREAD HEAD)
- BB. Spikes 5 mm. or more wide; spikelets 3- to several-flowered.
- C. Spikelets placed with edge to the rachis; glumes 1, or in the terminal spikelet 2. **LOLIUM** (p. 48)
- CC. Spikelets placed with flat side to the rachis; glumes 2.
- D. Lemma with distinct callus at base, falling at maturity with the grain; grain adherent to the palet. **AGROPYRON** (p. 48)
- DD. Lemma without a distinct callus, persisting after the grain has fallen; grain free from the palet.
- E. Glumes subulate, 1-veined. W. E. — Cultivated for its grain. (Celtic *sega* = a sickle; hence a grain for cutting.) **Secale cereale** (RYE)
- EE. Glumes lanceolate or ovate. 3- to many-veined. W. E. — Cultivated for grain. Our best source of flour. (L. *tritum* = rubbed or ground; because it was ground into flour.) **Triticum vulgare** (WHEAT)
- AA. Spikelets 2 or more at each joint of the rachis, but often some sterile.
- F. Spikelets 3 at each joint of the rachis, sterile or 1-flowered. **HORDEUM** (p. 49)
- FF. Spikelets 2-3 at each joint of the rachis, 2- to many-flowered.
- G. Glumes entire; rachis continuous, rarely breaking into pieces when mature. — (Gk. *elyetn* = to roll up; in some species the spike is somewhat enwrapped by the leaf sheath.) **Elymus** (WILD RYE)
- GG. Glumes 2- to many-parted or -cleft; rachis jointed, readily falling into pieces when mature. — (Gk. *sitas* = wheat or grain; likely because the plants have wheatlike heads.) **Sitanion** (BRISTLY WILD RYE)

LOLIUM (RYE GRASS)

Leaves flat. Spikelets in a simple terminal spike, several-flowered, sessile alternate; rachis somewhat zigzag; rachilla jointed between the flowers. Glume 1 except in the terminal spikelet, opposite the rachis. Lemma rounded on the back, 5-7-veined, obtuse to awned. Palet 2-keeled. Stamens 3. Grain smooth, adherent. — (Latin name.)

A. Perennial; glumes shorter than the spikelet (less the awns); leaf sheaths shorter than the internodes. W. — An early range grass.

L. perenne (PERENNIAL RYE GRASS)

AA. Annual; glumes equaling or exceeding the spikelets (less the awns); leaf sheaths longer than the internodes. W. — Seed slightly poisonous to man.

L. temulentum (DARNEL)

AGROPYRON (BUNCH-GRASS)

Perennial; stem erect, simple. Spikelets in a spike, closely sessile. Glumes narrower than the lemma, acute or awned. Lemma rounded on the back or slightly keeled above. 5-7-veined, obtuse to awned at apex. Palet 2-keeled, bristly ciliate on the keels. Grain pubescent at apex. — Range grasses. (Gk. *agros* = field, *pyros* = wheat; they were weeds in wheat.)

A. Plants densely tufted; lemma not hairy.

B. Glume awns 1-2.5 cm. long; glumes 4-6 mm. long.

C. Herbage pubescent; spike dense. E.

A. saxicola

CC. Herbage glabrous; spike loose. E.

A. flexuosum

BB. Glume awns either none or more than 1 cm. long.

D. Some of the lemma awns longer than their lemmas.

E. Glumes exceeding the lower lemma (less the awns); lemma awns erect, not at all divergent. E.

A. richardsoni

EE. Glumes shorter than the lower lemma (less the awns); lemma awns divergent or widely spreading.

F. Glumes attenuate into a scabrous awn.

G. Spikes 4-7 cm. long; rachis readily breaking at joints; glumes 5-8 mm. long (less the awn). C. E.

A. scribneri

GG. Spikes 10-25 cm. long; rachis not readily breaking at joints; glumes 10-14 mm. long (less the awn). E.

A. gmelini

FF. Glumes awnless. E.

A. spicatum (WHEAT BUNCH-GRASS)

DD. Lemma awns shorter than their lemmas or none.

H. Spikelets flattened. (See **FF.**)

HH. Spikelets terete or nearly so.

I. Lower glume 3-veined.

J. Leaves 3.5-9 cm. long; glumes scabrous on the keel. E.

A. brevifolium

JJ. Leaves 7.5-20 cm. long; glumes scabrous on the margin. E.

A. biblorum

II. Lower glume 5-veined.

K. Spikes 3-10 cm. long; glumes mostly widest above their middle. E.

A. violaceum

KK. Spikes 8-20 cm. long; glumes mostly widest below their middle. E.

A. tenerum

AA. Plants not tufted, stems from creeping rootstocks.

- L. Lemma hairy.
 M. Lemma villous; spike rather dense.
 N. Spikelets 5-7-flowered. E. *A. subvillosum*
 NN. Spikelets 7-13-flowered. E. (See PP.)
 MM. Lemma puberulent; spike long and not dense. E. *A. lanceolatum*
 LL. Lemma not hairy.
 O. Leaves smooth beneath, pubescent above. W. E. — Rhizomes medicinal. A bad weed in cultivated fields. *A. repens* (COUCH GRASS)
 OO. Leaves rough on both sides.
 P. Spikelets 4-7-flowered. (See KK.)
 PP. Spikelets 7-13-flowered. W. E. *A. occidentalis* (BLUEJOINT)

HORDEUM (BARLEY)

Leaves flat. Spikelets in spikes, 2-3 together at a joint of the rachis, sessile or short-stalked, often only 1 fertile in a cluster, 1-flowered, awned, lateral ones usually imperfect and short stalked. Glumes setaceous to narrowly lanceolate, rigid, persistent. Lemma lanceolate, rounded on the back, obscurely 5-veined above, usually awned. Palet shorter than the lemma, 2-keeled. Stamens 3. Grain hairy at tip, grooved, adherent. — (Latin name for barley.)

- A. Only the central spikelet of each group fertile.
 B. Flower of the central spikelet plainly stalked; glumes ciliate. W. E. — The barbed seeds get into the wool of sheep and into the eyes and throats of animals, sometimes even killing them. *H. murinum* (WALL BARLEY)
 BB. Flower of the central spikelet sessile; glumes not ciliate.
 C. Heads exclusive of awns about 5 mm. wide.
 D. Lemma awn of central spikelet 3.5-6 cm. long, of the lateral spikelets over half the lemma. W. E. — The beards collect in the mouths of cattle, causing ulcers and even death. *H. jubatum* (SQUIRREL-TAIL GRASS)
 DD. Lemma awn of the central spikelet 1.8-3 cm. long, of the lateral spikelets over half the lemma.
 E. Blades and sheaths of leaves glabrous. W. E. *H. caespitosum*
 EE. Blades and sheaths of leaves pilose. E. *H. comosum*
 DDD. Lemma awn of the central spikelet 0.4-1.2 cm. long, of the lateral spikelets not over half the lemma.
 F. Lateral spikelets with perfect flowers. E. *H. boreale*
 FF. Lateral spikelets with imperfect flowers.
 G. All of the glumes of each cluster tapering from the base.
 H. Leaf blades finely pubescent; inner glumes of the lateral spikelets about twice as long as the outer. U. *H. gussoneanum*
 HH. Leaf blades scabrous; both glumes of the lateral spikelets about the same width. W. E. *H. nodosum* (WILD BARLEY)
 GG. 3-4 of the glumes of each cluster widest above the base.
 I. Leaves rough above, smooth beneath; spikes 4-6 times as long as wide. E. *H. pusillum* (LITTLE BARLEY)
 II. Leaves smooth on both sides; spikes 2-3 times as long as wide. U. *H. geniculatum* (SEA BARLEY)
 CC. Heads exclusive of awns about 10 mm. wide. E. — Cultivated for grain. *H. distichon* (2-ROW BARLEY)
 AA. All 3 spikelets of each group fertile. W. E. — Cultivated for grain. *H. hexastichon* (6-ROW BARLEY)

CYPERACEAE (SEDGE FAMILY)

Herbs, annual or perennial; rhizomes present; stems 3-angled or terete, mostly solid. Leaves attenuate, mostly basal; *sheaths not split*. Flowers in spikes or spikelets, small, perfect or monoecious or dioecious, in the axils of scales; scales imbricate, chaffy; spikes again variously grouped unless solitary. *Perianth none or of mere bristles or scales*. Stamens usually 2-3, hypogynous; *anthers basifixed*. Ovary 1-celled; ovule 1; style 2-3-cleft. Fruit an akene, lens-shaped or somewhat 3-angled, membranous or crustaceous or bony. — A difficult family. Keys only to the genera. (F. & R. pp. 74-89.)

- A.** Akenes not inclosed in a saclike structure; flowers perfect; spikelets all alike.
- B.** Spikelets more or less flat; scales in 2 opposite rows.
- C.** Stem nearly naked; leaves mostly basal; perianth none. — (Gk. *kupeiros* = the ancient name for these plants.) **Cyperus** (CYPERUS)
- CC.** Stem with 3 distinct rows of leaves; leaves mostly on the stem; perianth of 6-9 bristles. W. — (Gk. *duo* = 2, *leichen* = a scale; the scales of the spikelets are in 2 ranks.) **Dulichium arundinaceum** (DULICHIMUM)
- BB.** Spikelets terete; scales imbricated all round.
- D.** Akenes not crowned with the bulbous base of the style.
- E.** Spikelets not a cottony mass.
- F.** Perennial; perianth of 0-6 bristles. — One of these is *S. occidentalis* (Tule), whose stems are used for the interior of cheap life preservers. (The Latin name of the Bulrush.) **Scirpus** (BULRUSH)
- FF.** Annual; perianth of a single hyaline scale between the rachilla and the akene. — (Gk. *hemi* = half, *karpheos* = chaff; because this genus has only 1 inner scale while most related genera have 2 or more.) **Hemicarpha** (HEMICARPHA)
- EE.** Spikelets each a white to brown cottony head of hairs 1-3 cm. wide. — (Gk. *erion* = wool or cotton, *phoros* = bearing; referring to the cottony spikes.) **Eriophorum** (COTTON GRASS)
- DD.** Akenes crowned with the persistent bulbous base of the style.
- G.** Stem leafless; spikelets solitary, terminal; perianth bristles usually present, 0-12. — (Gk. *elos* = a marsh, *chairō* = to rejoice; because it grows in wet places.) **Eleocharis** (SPIKE RUSH)
- GG.** Stem leafy at least at base; spikelets more than 1, in an involucrate umbel.
- H.** Akene 3-angled; perianth bristles none. U. — (Gk. *stenos* = narrow, *phyllon* = a leaf; on account of the very narrow leaves.) **Stenophyllus capillaris** (HAIR SEDGE)
- HH.** Akene lens-shaped; perianth bristles 9-15, downwardly barbed. W. — (Gk. *rhynchos* = a snout, *spora* = a seed; referring to the long-beaked akene.) **Rhynchospora alba** (WHITE BEAK-RUSH)
- AA.** Akenes inclosed in a saclike structure; flowers monoecious; spikes mostly of 2 kinds. — (Gk. *keirein* = to cut; referring to the sharp leaf-edges.) **Carex** (SEDGE)

ARACEAE (ARUM FAMILY)

Herbs, perennial, large. *Leaves large, simple. Flowers crowded on a spadix; spathe surrounding spadix, usually conspicuous.* Perianth of 4 or 6 green sepals. Stamens 4 or 6, opposite the sepals. *Fruit usually berry-like.*

A. Leaves 7-45 cm. wide, netted-veined, with skunklike smell; spathe yellow. W. C. E. — (Gk. *lysis* = a loosening, *chiton* = a mantle; referring to the loosening spathe.) *Lysichiton camtschatcense* (SKUNK CABBAGE)

AA. Leaves 2.5 cm. or less wide, parallel-veined, without skunklike smell; spathe green. E. — Rhizome medicinal. (The ancient name.)

Acorus calamus (SWEET FLAG)

LEMNACEAE (DUCKWEED FAMILY)

Minute, stemless, floating, merely 1 or more flattened or spherical multicellular green bodies either with roots hanging from the under side or without them. Flowers extremely rare. Fruit a utricle. — Floating on ponds or lakes.

A. Thalloid shoots 1-5-veined, with 0-1 rootlet; rootlets without vascular tissue. *LEMNA* (p. 51)

AA. Thalloid shoots 7-15-veined, with 2-10 rootlets; rootlets with central vascular cylinder. W. E. — (Gk. *spira* = a cord, *delos* = evident; from the threadlike roots.) *Spirodela polyrhiza* (LARGE DUCKWEED)

LEMNA (DUCKWEED)

Thalloid shoots with many needle-shaped crystals in the cells. — (Gk. *limne* = a swamp; referring to the habitat.)

A. Thalloid shoots long-stalked at base, broadly oar-shaped, 6-10 mm. long, 12 or fewer connected. *L. trisulca* (FAIRY PADDLE)

AA. Thalloid shoots sessile, elliptic-oblong, 2.5-4 mm. long, 5 or fewer connected.

L. minor (SMALL DUCKWEED)

PONTEDERIACEAE (PICKEREL-WEED FAMILY)

Herbs, low; stems creeping or ascending or floating. *Leaves grasslike. Flowers subtended by a leaflike spathe, perfect, mostly irregular; solitary, small, yellow. Perianth free from the ovary, corolla-like, 6-parted; segments linear; tube threadlike. Stamens 3, unequal, on the tube. Ovary fusiform; style 1; stigma 3-lobed. Fruit a many-seeded capsule.* — E. *In water or bogs.* (Gk. *hetera* = different, *anthera* = anther; ours and some other species have 2 forms of anthers.)

Heteranthera dubia (MUD PLANTAIN)

JUNCACEAE (RUSH FAMILY)

Annual or perennial, *grasslike or rushlike*. Inflorescence various. Flowers small, regular, hypogynous, persistent. *Sepals* 3, *glumaceous*. *Petals* 3, *similar to the sepals*. Stamens 6 or rarely 3; anthers introrse. Pistil 3-carpous, either 1-celled or 3-celled; *ovary superior*; stigmas 3. Fruit a loculicidal capsule, 3-valved. Seeds 3 to many, small. — Difficult family. Key only to the genera. (F. & R. pp. 90-94.)

- A. Leaf sheaths open; leaves never hairy, mostly not flat nor grasslike; capsule 1-celled or 3-celled, many-seeded; placentae parietal or axial. — (*L. jungere* = to bind; ropes were made by twisting together some species.) **Juncus** (RUSH)
- AA. Leaf sheaths closed; leaves often with a few large hairs, flat, grasslike; capsule 1-celled, 3-seeded; placenta basal. — (*Juncus* = a genus of rushes; Gk. *eidos* = like; hence, rushlike.) **Juncoides** (WOOD RUSH)

*** KEY DIRECT TO THE GENERA OF MELANTHACEAE, LILIACEAE, AND CONVALLARIACEAE**

- A. Leaves not grasslike, either wider or mere scales.
- B. Leaves mere scales; plants very much branched, ultimate branchlets threadlike. *Asparagus* in **CONVALLARIACEAE** (p. 62)
- BB. Leaves not scales; branching not profuse; branches not threadlike.
- C. Stems scapose or none, or leaves only from near base.
- D. Leaves only 2 or 3.
- E. Perianth 25-75 mm. long; perianth segments about equal in width; stamens 6. *Erythronium* in **LILIACEAE** (p. 55)
- EE. Perianth 6-9 mm. long; inner perianth segments narrower than the outer; stamens 3. *Scoliopus* in **CONVALLARIACEAE** (p. 62)
- DD. Leaves more than 3.
- F. Plant with bulb, glabrous; leaves 12 or more times as long as wide; fruit a capsule. *Camassia* in **LILIACEAE** (p. 55)
- FF. Plant with rhizome, hairy at least on the inflorescence; leaves 3-5 times as long as wide; fruit a berry. *Clintonia* in **CONVALLARIACEAE** (p. 62)
- CC. Stems leafy, not merely so at base.
- G. Petals very unlike the sepals in form or size or color.
- H. Leaves 3 in a whorl at the top of the stem, ovate or wider. *Trillium* in **CONVALLARIACEAE** (p. 62)
- HH. Leaves more than 3, not in a whorl, lanceolate or narrower. *Calochortus* in **LILIACEAE** (p. 55)
- GG. Petals and sepals alike or very nearly so.
- I. Flowers not white, or if so 42 mm. long or longer. JJ in **LILIACEAE** (p. 56)
- II. Flowers greenish white, 2-23 mm. long.

* These families are so poorly distinguished that it is easier to trace most of the genera direct. However, there is also a key to the genera under each family.

- J. Leaves 1-3. *Unifolium* in CONVALLARIACEAE (p. 62)
- JJ. Leaves more than 3.
- K. Flowers in a terminal raceme or panicle; stem not branched.
- L. Style 1; fruit a berry; stem 2-9 dm. high.
Vagnera in CONVALLARIACEAE (p. 62)
- LL. Styles 3; fruit a capsule; stem 6-30 dm. high.
Veratrum in MELANTHACEAE (p. 53)
- KK. Flowers either in a terminal umbel or else axillary; stem usually branched.
See EE in CONVALLARIACEAE (p. 62)
- AA. Leaves grasslike, narrow.
- M. Plant with onion-like odor and taste. *Allium* in LILIACEAE (p. 55)
- MM. Plant without either onion-like odor or taste.
- N. Stem none, or scapose, or leafy only near the base.
- O. Plant with rhizome.
- P. Plant stemless; flowers in a sessile umbel; bracts of the inflorescence leaflike, about twice as long as the flower and its stalk.
Leucocrinum in LILIACEAE (p. 55)
- PP. Plant with stem 15-90 cm. high; flowers in a terminal raceme or panicle; bracts of the inflorescence not leaflike, shorter than the flower and its stalk.
See C in MELANTHACEAE (p. 53)
- OO. Plant with bulb or corm.
- Q. Flowers in an umbel. See BB in LILIACEAE (p. 55)
- QQ. Flowers in an elongated raceme or panicle.
- R. Styles 3; capsule septicidal. See CC in MELANTHACEAE (p. 53)
- RR. Style 1; capsule loculicidal. See E in LILIACEAE (p. 55)
- NN. Stem not scapose, leafy and not only so at the base.
- S. Leaves very many, 50 or more, very tough and rigid, serrulate; plant with rhizome. *Xerophyllum* in MELANTHACEAE (p. 53)
- SS. Leaves few, 20 or fewer, not particularly tough nor rigid, entire; plant with bulb or corm. See II in LILIACEAE (p. 55)

MELANTHACEAE (BUNCH-FLOWER FAMILY)

Herbs, erect, perennial, with rootstocks or *rarely with* coated *bulbs*; stem leafy. Leaves wide or grasslike, parallel-veined but often reticulate between the large veins. Flowers solitary or in a raceme or a panicle, regular. Perianth segments 6, distinct or nearly so, usually persistent. Stamens 6. *Ovary* 3-celled, *superior or partly inferior*; styles 3, distinct or somewhat united. *Fruit* a *capsule, mostly septicidal*, rarely loculicidal. Seeds several to many, often tailed.

- A. Leaves narrow, linear; plants glabrous (except *Tofieldia* in part).
- B. Leaves few, 25 or fewer, not rigid, not rough-margined; inflorescence bracted.
- C. Stems with rhizomes; anthers 2-celled; leaves equitant.
- D. Perianth segments oblanceolate; pedicels bracted near the flower; filaments naked; anthers round-cordate; capsule ovate, 3-beaked, septicidal.

TOFIELDIA (p. 54)

DD. Perianth segments lanceolate; pedicels bracted near the middle; filaments woolly; anthers linear; capsule oblong, attenuate upward, loculicidal.

U. — (An anagram of *Anthericum*, from Greek *antherikos*, the supposed name of the Asphodel.) **Narthecium californicum** (BOG ASPHODEL)

CC. Stems from bulbs; anthers cordate or reniform, 1-celled; leaves not equitant.

E. Flowers nodding, yellowish purple; perianth segments acuminate, glandless.

W. C. — (Gk. *stenos* = narrow, *anthos* = a flower; referring to the narrow perianth segments.) **Stenanthium occidentale** (STENANTHIUM)

EE. Flowers erect, white or yellowish; perianth segments acute or blunter, with 1-2 glands just above the narrowed base. **ZYGADENUS** (p. 54)

BB. Leaves many, 50 or more, rigid, rough-margined; inflorescence bractless; anthers 2-celled; stem from a rhizome. **W. C. E.** — (Gk. *xeros* = dry, *phyllon* = a leaf; the leaves are not juicy.) **Xerophyllum tenax** (BEAR GRASS)

AA. Leaves wide, lanceolate to broadly elliptic; stem and inflorescence pubescent; inflorescence bracted; anthers 1-celled; stem from a rhizome.

VERATRUM (p. 55)

TOFIELDIA (FALSE ASPHODEL)

Slender, mostly tufted, with rootstock. Stems simple, leafy only at base. Leaves 2-ranked, equitant, linear, grasslike. Flowers in a terminal bracted spike or raceme, perfect, usually involucrate by 3 bractlets on the pedicel. Perianth persistent; segments 3-veined, white or greenish. Stamens equaling the perianth. Capsule septicidal, 3-lobed, beaked by 3 persistent styles. — In mountain marshes. (Honor of a Mr. Tofield, a little-known English botanist.)

A. Involucre bracts united $\frac{3}{4}$ or more of the distance to the apex; perianth segments 2-4 mm. long; capsule widest below the middle. **W. C. E.** **T. intermedia**

AA. Involucre bracts united $\frac{1}{2}$ or less of the distance to the apex; perianth segments about 6 mm. long; capsule widest above the middle. **C.** **T. occidentalis**

ZYGADENUS (ZYGADENUS)

Stem leafy, from a coated bulb. Leaves linear. Flowers white or yellowish, perfect or polygamous, in a terminal glabrous panicle or raceme. Perianth segments similar, with 1-2 glands just above the narrowed base. Stamens free. Styles 3, distinct. Capsule 3-lobed, the compartments not diverging. — (Gk. *zygos* = a yoke, *adenos* = a gland; because some species have glands on each perianth segment.) The 2d and 3rd are known to be poisonous to cattle. The others are so nearly like them that all are under suspicion.

A. Perianth segments 8-14 mm. long.

B. Glands not obcordate; perianth segments 10-14 mm. long; leaves 12-24 mm. wide. **U.** **Z. douglasii**

BB. Glands obcordate; perianth segments 8-10 mm. long; leaves 4-12 mm. wide. **W. E.** **Z. elegans**

AA. Perianth segments 2-8 mm. long.

- C. Stem leaves not sheathing; racemes usually simple; perianth segments 4-8 mm. long; capsule 8-12 mm. long. W. C. E. **Z. venenosus** (DEATH CAMAS)
- CC. Stem leaves usually sheathing; racemes usually paniced; perianth segments 2-4 mm. long; capsule 12-24 mm. long. W. C. E. **Z. paniculatus**

VERATRUM (FALSE HELLEBORE)

Tall. Leaves wide, strongly veined, plicate. Flowers in a terminal pubescent panicle, rather large, the lower mostly staminate only. Perianth segments similar. Stamens free. Capsules sessile, membranous, 3-beaked by the persistent diverging styles, septicidal. Seeds flat, margined or winged. — (*L. vere* = true, *ater* = black; referring to the root.) Poisonous, specially the roots.

- A. Flowers green; panicle drooping; perianth segments 8-15 mm. long. W. C. E. — Medicinal plant. **V. viride** (GREEN HELLEBORE)
- AA. Flowers white; panicle erect; perianth segments 15-20 mm. long. W. C. E. **V. californicum** (WHITE HELLEBORE)

LILIACEAE (LILY FAMILY)

Herbs, perennial, *with bulbs or corms* or rarely with a rhizome, stems scapose or leafy, mostly simple. Flowers perfect, regular, mostly conspicuous. Perianth segments 6, distinct or united; mostly alike in color and form (not in *Calochortus*). Stamens 6, or 3 of these replaced by staminodia, on the perianth or the receptacle. Styles none (*Calochortus*), or united partly or wholly. Stigmas 1 or 3. Ovary 3-celled, *superior*. Fruit a capsule, *loculicidal* (septicidal in *Calochortus*).

- A. Perianth segments plainly united; inflorescence with scarious bracts; leaves linear.
- B. Plants with rhizomes; perianth salverform, white, tube very narrow, segments several-veined; pedicels not jointed; anthers circinate when dry. E. — Believed to be poisonous to sheep. (Gk. *leukos* = white, *krinon* = a lily; the white flower is lily-like.) **Leucocrinum montanum** (LEUCOCRINUM)
- BB. Plants with coated bulbs; perianth not salverform, mostly not white, segments 1-veined; pedicels jointed; anthers not circinate.
- C. Perianth funnellform, not saccate at base, various in color.

HOOKERA (p. 58)

- CC. Perianth broadly tubular, 6-saccate at base, deep scarlet with yellowish lobes. U. C. — (Honor of J. C. Brevoort, of New York.)

Brevoortia idamaia (Ida May's Fire Crackers)

- AA. Perianth segments distinct, or slightly united at base (some species of *Allium*); leaves various; plants from scaly or solid bulbs.

- D. Odor onion-like; flowers in a terminal umbel, on a scapose stem; inflorescence subtended by a whorl of 2-5 scarious bracts which are distinct or united.

ALLIUM (p. 56)

- DD. Odor none or not onion-like; flowers not in umbels, or if so stems not scapose; inflorescence not subtended by a whorl of scarious bracts.

- E.** Inflorescence distinctly a raceme or panicle, with scarious bracts; pedicels jointed; anthers versatile.
- F.** Stem simple; inflorescence a raceme; perianth segments 3-7-veined, 17-30 mm. long. **CAMASSIA** (p. 61)
- FF.** Stem branched; inflorescence a raceme or panicle; perianth segments 1-3-veined.
- G.** Stem-leaves few; perianth segments 5-10 mm. long, apparently 1-veined but closely 3-veined; style short. — Mountain plants, not common. (Gk. *schoenos* = a reed, *lirion* = a lily; apparently referring to the reed-like stems.)
* **Schoenolirion**
- GG.** Stem leaves rather numerous; perianth segments 16-20 mm. long, plainly 3-veined; style long. U. C. — (Gk. *chloros* = green, *gala* = milk; from the greenish white juice.) **Chlorogalum pomeridianum** (SOAP-ROOT)
- EE.** Inflorescence not distinctly racemose, with foliaceous bracts or none; pedicels not jointed; anthers basifixed (except in *Lilium*).
- H.** Perianth segments all alike; capsule loculicidal; style present.
- I.** Leaves only 2, basal, wide; capsule 3-angled. **ERYTHRONIUM** (p. 60)
- II.** Leaves more than 2, not all basal.
- J.** Perianth segments 0.8-1 cm. long, white; stem 5-13 cm. high; leaves grasslike, not in a whorl, basal ones exceeding the stem: capsule 3-angled. W. C. E. — (Probably in honor of A. J. Lloyd, an English surveyor and naturalist.) **Lloydia serotina** (WHITE-FLOWERING GRASS)
- JJ.** Perianth segments 2.5-10 cm. long, mostly not white; stem mostly higher; leaves mostly not grasslike, often in whorls, not exceeding the stem; capsule 6-angled.
- K.** Perianth segments oblanceolate; nectary a linear groove; bulb scales lanceolate. **LILIUM** (p. 58)
- KK.** Perianth segments lanceolate; nectary a shallow pit; bulb scales wider than lanceolate, very thick. **FRITILLARIA** (p. 59)
- HH.** Outer perianth segments smaller than the inner, greenish; capsule septicidal; style none. **CALOCHORTUS** (p. 60)

ALLIUM (ONION)

Perennial, mostly with coated bulbs, with onion-like odor. Leaves basal, linear or lanceolate. Pedicels not jointed. Perianth segments nearly equal, lanceolate to linear, 1-veined, more or less gibbous at base. Stamens 6, on the base of the perianth; anthers versatile. Ovary sessile, subglobose; style filiform. Capsule obtusely 3-lobed. Seed obovoid, wrinkled. — Many flavor milk when eaten by cattle. The cultivated onion is *A. cepa*. (A Latin name for Garlic.)

- A.** Perianth segments acute or blunter.
- B.** Perianth shorter than the stamens; bulb coat not reticulate. W. C. **A. cernuum**
- BB.** Perianth longer than the stamens.
- C.** Perianth twice as long as the stamens.
- D.** Ovary plainly 6-crested at the summit; bulb coat not reticulate. W. E. **A. crenulatum**

- DD. Ovary obscurely crested or ridged.
 E. Bulb coat reticulate; umbel nodding; flowers white; perianth 8 mm. long.
 E. *A. collinum*
 EE. Bulb coat not reticulate; umbel not nodding; flowers red or white; perianth 10 mm. long. E. *A. tolmiei*
 CC. Perianth $1\frac{1}{2}$ times as long as the stamens or shorter; bulb coat reticulate in some species.
 F. Leaves longer than the scape; perianth segments acute or obtuse, not apiculate; bulb ovoid.
 G. Spathe of 2 bracts.
 H. Leaves about 4 mm. wide; bracts of the spathe acuminate; pedicels 8-16 mm. long; perianth segments acute, entire. E. *A. watsoni*
 HH. Leaves less than 2 mm. wide; bracts of the spathe acute; pedicels 2-4 mm. long; perianth segments obtuse, delicately denticulate. E. *A. simillimum*
 GG. Spathe of 3 bracts. U. *A. tribracteatum*
 FF. Leaves shorter than the scape; perianth segments acute or apiculate.
 I. Perianth segments entire, not cuspidate.
 J. Bulb ovoid; bulb coat not fibrous; scape 1-2 dm. high; bracts of the spathe 8-10 mm. long, acute. E. *A. madidum*
 JJ. Bulb oblong; bulb coat fibrous; scape 2.5-3.3 dm. high; bracts of the spathe 12-21 mm. long, acuminate, C. E. *A. geyeri*
 II. Inner perianth segments serrulate, abruptly cuspidate. (See M.)
 AA. Perianth segments acuminate.
 K. Scape terete or nearly so.
 L. Inner perianth segments serrulate.
 M. Perianth segments $1\frac{1}{2}$ the stamen-length or less, their tips recurved. W. C. E. *A. acuminatum*
 MM. Perianth segments twice the stamen-length, almost straight. U. E. *A. bolanderi*
 LL. Perianth segments entire.
 N. Ovary not crested; bulb coat not reticulate.
 O. Flowers dark red; scape 17-37 cm. high; bulb ovate. E. *A. douglasii*
 OO. Flowers rose color; scape 30-60 cm. high; bulb oblong. E. — Grown in gardens for the edible tops. *A. schoenoprasum* (CHIVES)
 OOO. Flowers white to pinkish; scape 2.5-10 cm. high; bulb ovate. E. *A. macrum*
 NN. Ovary crested; bulb coat reticulate in some species.
 P. Umbels few-flowered; bulb coat obscurely or not at all reticulate; scape 7.5-20 cm. high; bracts of spathe acuminate; flowers white or rose color. E. *A. nevillei*
 PP. Umbels many-flowered.
 Q. Bracts of the spathe abruptly acute; scape 15-50 cm. long; flowers white or rose color. C. E. *A. attenuifolium*
 QQ. Bracts of the spathe acuminate.
 R. Scape 10-30 cm. long; flowers pink or crimson; bulb coat reticulate. E. *A. serratum*
 RR. Scape 25-63 cm. long; flowers white or rose color; bulb coat fibrous. (See JJ.)
 KK. Scape flattened, somewhat 2-edged (somewhat 3-angled below in *A. validum*).
 S. Scape 30-75 cm. long, longer than the leaves; stamens exserted. C. *A. validum*
 SS. Scape 5-15 cm. long, as long or shorter than the leaves; stamens included.
 T. Perianth segments 15-17 mm. long, serrulate. U. *A. falcifolium*
 TT. Perianth segments 6-12 mm. long, entire.
 U. Perianth segments very little longer than the stamens. E. *A. anceps*

UU. Perianth segments nearly twice as long as the stamens.

V. Ovary not crested, its cells shortly apiculate. E.

A. cusickii

VV. Ovary 6-crested. E.

A. pleianthum

HOOKERA (FOOL'S ONION)

Perennial; corms with fibrous membranes, coated; stem scapose. Leaves narrow. Flowers blue or purple or white or yellow, solitary or in a bracted umbel, on jointed pedicels. Stamens either 6, of which 1 is opposite each perianth segment and more or less united with it; or only 3, the 3 outer replaced by staminodia. Style persistent, about equaling the anthers; stigmas 3, short, divergent. Capsule ovate-oblong. Seeds angled. — (Honor of J. Hooker, an English botanist.)

A. Stamens with anthers 3, alternating with 3 antherless staminodia; anthers basifixed; capsule subsessile.

B. Scapes 7-25 cm. high; pedicels 12-100 mm. long; capsules about 6 mm. long. W. H. coronaria (HARVEST FOOL'S ONION)

BB. Scapes 30-120 cm. high; pedicels 2-6 mm. long; capsule about 10 mm. long.

C. Scapes 6-12 dm. high, smooth; umbel often elongated into a dense short raceme; staminodia deeply cleft, projecting beyond the anthers; seeds usually 1 in each cell. W. C. H. pulchella (OOKOW)

CC. Scapes 3-6 dm. high, somewhat scabrous; umbel never elongated; staminodia entire, obtuse, about equaling the anthers; seeds several in each cell. U. H. multiflora

AA. Stamens with anthers 6; anthers versatile (except in *H. capitata*); capsule stipitate (except in *H. capitata*).

D. Perianth blue or purple or white.

E. Perianth lobes from slightly longer to much shorter than the tube; perianth usually blue or purple, but sometimes white.

F. Stamens in 2 rows.

G. Filaments of the inner row of stamens narrow; flowers dark blue. E.

H. douglasii

GG. Filaments of the inner row of stamens broad; flowers light blue.

H. Perianth lobes nearly as long as the tube. W. E.

H. howellii

HH. Perianth lobes much shorter than the tube. E.

H. bicolor

FF. Stamens in one row.

I. Perianth 1.2-2 cm. long, the lobes slightly longer than the tube; pedicels 1-12 mm. long. U. C. H. capitata

II. Perianth 2.5-3 cm. long, the lobes slightly shorter than the tube; pedicels 12-50 mm. long. U. H. bridgesii

EE. Perianth lobes more than twice as long as the tube; perianth white, with green midveins; stamens in 2 rows. W. E. H. hyacintha

DD. Perianth yellow, with blue midveins; stamens in 2 rows. U. H. hendersonii

LILIUM (LILY)

Bulbs scaly; stems leafy, simple. Leaves flat, sessile, whorled or scattered, netted-veined but the chief veins from the base. Flowers in bracted racemes or umbel-like clusters, usually large; pedicels not jointed, with foliaceous bracts. Perianth funnellform. Stamens 6, hypogynous, included; anthers versatile, extrorse. Stigma 3-lobed. Capsule sessile,

erect. — *L. longiflorum* is the Easter Lily; *L. tigrinum* is the Tiger Lily. (Latin name.)

- A. Flowers orange-yellow or reddish, mostly conspicuously spotted.
- B. Flowers nodding; perianth segments 3.3–7.5 cm. long; capsule oblong, 2.5–4 cm. long.
- C. Leaves oblanceolate, acute; perianth segments 3.7–5 cm. long, 8–12 mm. wide; anthers yellow; capsule short-oblong, 2.2–2.8 cm. long. W. C.
 - L. parviflorum* (WILD TIGER-LILY)
- CC. Leaves narrowly lanceolate, sharply acuminate; perianth segments 5–7.5 cm. long, 12–18 mm. wide; anthers red; capsule narrowly oblong, 3.7–4 cm. long. W. C.
 - L. pardalinum* (WILD TIGER-LILY)
- BB. Flowers erect or nearly so; perianth segments 2.5–3.8 cm. long; capsule subglobose, 1.2–2 cm. long. C.
 - L. parvum* (SMALL LILY)
- AA. Flowers white or purplish or pale yellow or red, finely spotted or spotless.
- D. Flowers dull purplish red outside, bright red and dotted with maroon inside. U.
 - L. bolanderi* (RED LILY)
- DD. Flowers white or pale lilac, becoming tinged with rose or purple when old, mostly dotted with purple or brown.
- E. Flowers horizontal, finely dotted with purple; perianth segments 7.5–10 cm. long; anthers 10–12 mm. long. U. C.
 - L. washingtonianum* (WASHINGTON LILY)
- EE. Flowers erect or ascending, somewhat dotted with brown; perianth segments 4–7.5 cm. long; anthers 4–6 mm. long. U.
 - L. rubescens* (BROWN-SPOTTED LILY)

FRITILLARIA (RICE-ROOT)

Bulb scaly; stem simple, leafy. Leaves flat, sessile, whorled or scattered. Flowers usually large, either solitary, or in a raceme or subumbellate cluster with foliaceous bracts. Perianth funnellform or campanulate. Stamens 6, hypogynous, included; anthers versatile, extrorse. Stigma 3-lobed or -cleft. Capsule sessile. — (*L. fritillus* = a dice box; referring to the spots on the flower.)

- A. Flowers yellow, sometimes with a slight purplish tinge, not spotted; stigma shortly 3-lobed; capsule obtusely angled. E.
 - F. pudica* (YELLOW RICE-ROOT)
- AA. Flowers brownish purple, more or less spotted with green; stigmas 3, linear; capsule acutely angled (except *F. camtschaticensis*).
- B. Flowers distinctly mottled; capsule acutely angled.
- C. Leaves mostly scattered; capsule merely acute-angled.
- D. Leaves 6–20, linear, not glaucous; stamens about 8 mm. long. C. E.
 - F. atropurpurea*
- DD. Leaves 2–4, oblong-lanceolate, glaucous; stamens about 12 mm. long. U.
 - F. glauca*
- CC. Leaves in 1 to 3 whorls, lanceolate to linear-lanceolate; capsule broadly winged. W. C. E.
 - F. lanceolata* (WHORLED RICE-ROOT)
- BB. Flowers obscurely mottled; capsule obtusely angled. W. C.
 - F. camtschaticensis*
- AAA. Flowers yellow outside, yellow and spotted with scarlet inside; stigmas 3, linear; capsule obscurely angled. U.
 - F. recurva*

ERYTHRONIUM (DOG-TOOTH VIOLET)

Low, from membrane-coated corm; stem scapelike. Leaves flat, smooth, tapering at base. Flowers large, solitary or in a terminal raceme. Perianth segments lanceolate, deciduous, mostly revolute, the inner usually with a callous tooth on each side of the base and a groove in the middle. Stamens 6, hypogynous. Stigma 3-lobed or -cleft. Capsule nearly sessile, obovoid, membranous. — (Gk. *erythros* = red; because some European species have reddish flowers.)

- A. Leaves mottled.
- B. Flowers somewhat purple specially on the inside, often with some white or yellow.
- C. Perianth segments acuminate, white or pinkish rose outside, golden orange deepening to purple on the inside; anthers bright yellow. W. *E. revolutum*
- CC. Perianth segments obtuse, dark purple at base, bordered with yellow above; anthers brownish. U. *E. hendersoni*
- BB. Flowers white or yellow or pink, without purple.
- D. Inner perianth segments with neither auricles nor scales at base; stigmas faintly lobed; leaves acute. U. *E. howellii*
- DD. Inner perianth segments with scales and sometimes with auricles at base; stigmas plainly lobed or segmented.
- E. Leaves acute; outer perianth segments acuminate, 3.5–5 cm. long; stigmas distinct. W. *E. giganteum*
- EE. Leaves obtuse; outer perianth segments obtuse, 2.5–3.2 cm. long; stigmas united by their edges. U. *E. citrinum*
- AA. Leaves not mottled.
- F. Flowers white, orange at base, often pinkish when old; outer perianth segments acuminate. W. C. *E. montanum*
- FF. Flowers bright yellow, whitish at base; outer perianth segments obtuse.
- G. Anthers white; flowers 2.5–3.2 cm. long. W. C. E. *E. parviflorum*
- GG. Anthers purple; flowers 3.7–7.5 cm. long. E. *E. grandiflorum*

CALOCHORTUS (MARIPOSA LILY)

Perennial, from coated bulb; stem simple or branched, leafy. Leaves linear-lanceolate, only 1 basal, many-veined, those on the stem clasping. Flowers in a terminal bracted raceme. Sepals 3, lanceolate, greenish. Petals 3, cuneate-obovate, wide, variously colored. Stamens 6, on the base of the perianth segments, included; anthers linear. Stigmas 3, sessile, recurved, persistent. Capsule sessile, elliptic to oblong, thin, 3-angled or -winged, mostly septicidal. — (Gk. *kalos* = beautiful, *chortos* = grass. The leaves are grasslike.)

- A. Flowers pink or purplish or lavender, sometimes of a different color at base.
- B. Petals acute or acuminate.
- C. Petals 3.5–5 cm. long; anthers obtuse, 8–12 mm. long.
- D. Petals purple, hairy $\frac{1}{2}$ way up inside. E. *C. macrocarpus*
- DD. Petals pale blue, hairy only $\frac{1}{2}$ way up inside. E. *C. cyaneus*
- CC. Petals 1.2–1.7 cm. long; anthers acuminate, about 4 mm. long. U. *C. maweanus*

- BB.** Petals obtuse to truncate.
E. Petals denticulate.
F. Sepals ovate-lanceolate; petals often with a purple spot on each side of the scale; anthers obovate; capsule nodding. **U.** *C. uniflorus*
FF. Sepals narrowly lanceolate; petals with a purple band above the gland; anthers ovate; capsule erect. **E.** *C. longibarbus*
EE. Petals entire.
G. Sepals 3.2-4 cm. long, hyaline-margined on 1 side; anthers obtuse, 12-17 mm. long. **E.** *C. nitidus*
GG. Sepals 1.2-2.1 cm. long; anthers acute, 4-8 mm. long.
H. Sepals hyaline-margined on 1 side; petals white with dark base, with short hairs inside; petal gland transversely oblong; capsule erect. **W.** *C. howellii*
HH. Sepals not hyaline-margined; petals yellowish purple, with long hairs inside; petal gland rounded; capsule nodding. **W. C.** *C. tolmiei*
AA. Flowers white or yellowish, usually darker at base.
I. Sepals 3.2-4 cm. long, hyaline-margined on 1 side; petals with an indigo spot near the center. **E.** *C. nitidus*
II. Sepals 2.5 cm. long or shorter, either hyaline-margined on both sides or on neither; petals without spot other than gland (except *C. elegans*).
J. Petals narrowly ovate, acute; pod erect. **C. E.** *C. lyallii*
JJ. Petals broadly rhombic-ovate or broadly obovate, obtuse to rounded (except *C. maweanus*).
K. Sepals somewhat yellowish inside; anthers obtuse; capsule erect. **C. E.** *C. nuttallii* (SEGO LILY)
KK. Sepals not yellowish inside; anthers acuminate; capsule nodding.
L. Petals yellowish at least in part.
M. Petals thinly hairy on the inside, gland naked; sepals without pit at base inside; anthers acuminate. **E.** *C. apiculatus*
MM. Petals densely hairy on the inside, gland more or less covered by a scale.
N. Sepals with purple pit at base inside; anthers long-acuminate; stem 1.5-2 dm. high; leaf 3-8 mm. wide. **C.** *C. subalpinus*
NN. Sepals without pit; anthers abruptly acuminate; stem 2-4 dm. high; leaf 8-12 mm. wide. **W.** *C. purdyi*
LL. Petals without yellow color.
O. Petals acute, white or tinged with rose, sometimes purplish at base; anthers without hook at tip; capsule acute to obtuse. **U.** *C. maweanus*
OO. Petals obtuse, white or greenish, sometimes with a purple spot at base; anthers without hook at tip; capsule rounded at apex. **U. E.** *C. elegans*
OOO. Petals obtuse, white or greenish, without purple; anthers with hook at tip; capsule narrowly beaked. **C.** *C. lobbii*

CAMASSIA (CAMAS)

Perennial, with scaly bulb; stem scapose. Leaves usually basal, flat. Flowers blue to white. Perianth segments persistent. Stamens 6, on the base of the perianth, shorter than the perianth; anthers introrse, versatile. Style filiform, apex slightly 3-lobed, its base persistent. Capsule sessile, 3-lobed and 3-angled, 3-valved. — (The Indian name was Camas or Quamash.) The Indians gathered the bulbs for food.

- A.** Perianth irregular; segments 3-5-veined, inner segments short-clawed at base, outer segments narrower and clawless; leaves 6-16 mm. wide; bracts of the inflorescence subulate. **W. E.** *C. quamashii*

AA. Perianth regular.

B. Leaves 12 mm. or less wide.

C. Bracts of the inflorescence lanceolate or linear-lanceolate.

D. Flowers blue or white; perianth segments usually 7-veined; capsule conspicuously veined. W. C. C. leichtlinii

DD. Flowers blue; perianth segments usually 5-veined; capsules not conspicuously veined. E. C. suksdorfii

CC. Bracts of the inflorescence filiform-subulate. U. C. howellii

BB. Leaves 13-37 mm. wide; perianth segments 3-5-veined. E. C. cusickii

CONVALLARIACEAE (LILY-OF-THE-VALLEY FAMILY)

Herbs, erect, perennial, with rhizomes, *never with bulbs nor corms; tendrils none*. Leaves either wide or scalelike, simple, alternate or whorled or basal; wide leaves parallel-veined or with chief veins from the base. *Flowers* regular, *perfect*, variously arranged. Perianth segments 6 or rarely 4, distinct or partly united; tube 6-lobed or -toothed. Stamens 4 or 6, hypogynous or on the perianth. *Ovary* 1-3-celled, *superior*; styles 1 or 3; stigma 2-3-lobed or entire. *Fruit* a *fleshy berry* or rarely a capsule. Seeds few to many.

A. Leaves minute, scalelike; stem much branched; ultimate branchlets threadlike. W. E. — Cultivated for its edible shoots. (The Greek name for similar plants.) Asparagus officinale (ASPARAGUS)

AA. Leaves large, foliaceous, wide; stems simple or sparingly branched; branchlets not threadlike.

B. Leaves not 3, or if so not in a whorl on the stem; flowers either more than 1 or not terminal (except *Clintonia*); none of the perianth segments dark green.

C. Perianth segments alike; fruit a berry; leaves more than 2 (except *Unifolium*); stem plainly above ground (except *Clintonia*).

D. Leaves all basal, gradually narrowed to a petiole; leaf blade widest above the middle. CLINTONIA (p. 63)

DD. Leaves alternate and scattered along an elongated stem, or only 1, either without petiole or abruptly petioled; leaf blade widest below the middle.

E. Leaves 1-3, with slender petiole; perianth segments 4; stamens 4; ovary 2-celled; stem simple. W. C. — (*L. unus* = 1, *folium* = a leaf; because sterile plants usually have only 1 leaf.)

Unifolium bifolium (WILD LILY-OF-THE-VALLEY)

EE. Leaves more than 3, sessile or very nearly so; perianth segments 6; stamens 6; ovary 3-celled.

F. Flowers many, in a terminal raceme or panicle; stem simple; leaves not oblique at base; berry 1-3-seeded. VAGNERA (p. 63)

FF. Flowers few, in a terminal umbel; stem branched; leaves somewhat oblique at base; berry 3- to many-seeded. DISPORUM (p. 63)

FFF. Flowers few, axillary, solitary or 2 on a forked peduncle; stem simple or branched; leaves not oblique at base; berry many-seeded.

STREPTOPUS (p. 64)

CC. Perianth segments unlike; fruit a capsule; leaves 2; stem hardly rising above the ground. U. C. — (Gk. *scolex* = a worm, *pous* = a foot; referring to the wormlike scape.) *Scoliopus hallii* (TWIN-LEAF)

BB. Leaves 3, in a whorl near the stem tip; flower 1, terminal; perianth of 3 dark green and 3 brighter colored segments. *TRILLIUM* (p. 64)

CLINTONIA (CLINTONIA)

Leaves all basal. Peduncle elongated, scapelike. Flowers white or red. Perianth segments 6, equal. Stamens 6; anthers versatile. Fruit a berry, smooth. — (Honor of De Witt Clinton, a former governor of New York.)

A. Flowers 1 or rarely 2; perianth white, 16–24 mm. long; peduncle shorter than the leaves. W. C. E. *C. uniflora*

AA. Flowers many; perianth deep rose, 8–14 mm. long; peduncle longer than the leaves. U. *C. andrewsiana*

VAGNERA (FALSE SOLOMON'S SEAL)

Stem scaly below, leafy above. Leaves wide, alternate. Perianth segments distinct, white or greenish white. Stamens on base of perianth; anthers introrse. Ovary sessile; cells 2-ovuled; stigma obscurely 3-lobed. — (Probably in honor of M. Wagner, a German traveler and naturalist.)

A. Inflorescence a raceme, 3–20-flowered; flowers 6–10 mm. long; perianth shorter than the stamens.

B. Leaves spreading, flat; racemes 3–9-flowered; perianth twice as long as the stamens; rhizome slender. W. C. E. *V. sessilifolia*

BB. Leaves ascending, folded; raceme 6–20-flowered; perianth less than 1½ times as long as the stamens; rhizome stout, fleshy. E. *V. stellata*

AA. Inflorescence a panicle, many-flowered; flowers 2 mm. or less long; perianth longer than the stamens.

C. Leaves acuminate, the lower ones with a very short petiole, not clasping. W. E. *V. racemosa* (WILD SPIKENARD)

CC. Leaves acute, all sessile, more or less clasping. W. C. E. *V. amplexicaulis*

DISPORUM (FAIRY BELLS)

Stem branched, scaly below, leafy above. Leaves somewhat oblique. Flowers rather small, in a terminal few-flowered umbel. Perianth segments distinct. Stamens hypogynous; anthers extrorse. Ovary sessile; cells mostly 2-ovuled; stigmas 1 or 3. — (Gk. *dis* = double, *spora* = a seed; because the cells of the ovary are 2-ovuled.)

A. Leaves rounded or slightly cordate at base, not clasping; stigma 3-cleft.

B. Plant much branched; perianth segments 12–22 mm. long; stamens about ¾ as long as the perianth; berry short-beaked, nearly smooth except at beak, 3–6-seeded. W. C. *D. smithii*

BB. Plant sparingly branched; perianth segments 12–14 mm. long; stamens about equaling the perianth; berry not beaked, papillose, 3–18-seeded. E. *D. majus*

AA. Leaves mostly cordate at base (except *D. trachyandrum*), at least the lower mostly clasping; stigma entire.

C. Leaves averaging about 3.7–5 cm. long; stamens more than ¾ as long as the perianth; filaments elongated, longer than the anthers.

- D. Leaves long-acuminate; pedicels woolly-pubescent; stamens about $1\frac{1}{2}$ times as long as the perianth; berry acutish. W. C. E. **D. oreganum**
- DD. Leaves acute or short-acuminate; pedicels not woolly-pubescent; stamens about equaling or shorter than the perianth; berry beaked or obtuse.
- E. Leaves deeply cordate at base; stamens about equaling the perianth; ovary pubescent, obtuse. U. **D. hookeri**
- EE. Leaves rounded to cordate at base; stamens about $\frac{2}{3}$ as long as the perianth; ovary glabrous, with short stout beak. U. **D. trachyandrum**
- CC. Leaves averaging about 2.5 cm. long; stamens $\frac{1}{2}$ as long as the perianth; filaments very short, much shorter than the anthers. U. **D. parvifolium**

STREPTOPUS (TWISTED-STALK)

Stem leafy. Flowers axillary, solitary or 2 on a forked peduncle. Perianth segments distinct. Stamens on base of perianth. Ovary sessile; stigma entire to 3-cleft. — (Gk. *streptos* = twisted, *pous* = foot; because the peduncles are bent or twisted about the middle.)

- A. Flowers rotate. C. **S. streptopoides**
- AA. Flowers narrowly campanulate.
- B. Leaves glaucous beneath, strongly clasping at base; flowers greenish white; stigma entire. W. C. E. **S. amplexifolius**
- BB. Leaves green on both sides, not clasping, but sessile; flowers rose-purple; stigma 3-cleft. W. C. E. **S. roseus**

TRILLIUM (TRILLIUM)

Glabrous; rhizome short, tuber-like; stem short, simple, with scarious sheaths at base. Leaves netted-veined, but the chief veins from the base. Sepals lanceolate, persistent. Stamens 6, hypogynous. Ovary 3-6-angled or 3-6-lobed, 3-celled; styles 3. Fruit a capsule, 3-celled or imperfectly 1-celled, berry-like. Seeds many. — (L. *trilix* = triple; because leaves and flower parts are in 3's.)

- A. Flowers sessile.
- B. Leaves sessile, mottled; petals whitish; sepals obtuse; anthers white. W. **T. chloropetalum** (MOTTLED TRILLIUM)
- BB. Leaves long-petioled, usually not mottled; petals brown-purple; sepals acute; anthers dark purple. E. **T. petiolatum** (PURPLE TRILLIUM)
- AA. Flowers with peduncle 2.5-7.5 cm. long.
- C. Ovary 3-lobed or -angled; leaves oblong. U. **T. rivale**
- CC. Ovary 6-angled; leaves rhombic-ovate. W. C. E. **T. ovatum**

SMILACEAE (SMILAX FAMILY)

Shrubby or herbaceous, *climbing*. Leaves alternate, wide, netted-veined, petioled, *with stipular tendrils*. Flowers small, *dioecious*, in axillary umbels; yellowish or greenish. Perianth segments 6, similar, distinct. Stamens mostly 6; filaments ligulate; anthers basifixed, introrse. Ovary superior, 3-celled or rarely 1-celled; style very short or none; stigmas 1-3. Fruit

a berry, globose, small. Seeds 1-6. — (Gk. *smile* = a grater; from the prickly-rough stems of some.) U. C. **Smilax californica** (SMILAX)

IRIDACEAE (FLAG FAMILY)

Herbs, perennial. Leaves equitant, sheathing, 2-ranked, sword-like or linear, evergreen or withering in the fall. Inflorescence subtended by the spathe-like bracts. *Flowers* showy, perfect, *regular*. Perianth petal-like, 6-cleft; segments in 2 series, withering-persistent. *Stamens* 3, on the base of the 3 outer perianth segments; anthers extrorse. *Ovary* 3-celled, *inferior*. Fruit a capsule, 3-lobed or angled, loculicidal. Seeds few to many.

A. Perianth 30-60 mm. long, white or blue; styles petal-like; style branches opposite the anthers. **IRIS** (p. 65)

AA. Perianth 6-17 mm. long; styles filiform; style branches alternate with the anthers.

B. Flowers blue, rarely whitish; filaments united to the top.

SISYRINCHIUM (p. 66)

BB. Flowers not blue, rarely whitish; filaments united only at base.

C. Flowers yellow, with veins or stripes of black or brown or orange; scape broadly 2-winged. **HYDASTYLUS** (p. 66)

CC. Flowers from whitish to bright purplish-red; scapes compressed but not winged. W. E. — (Meaning not determined.)

Olsynium grandiflorum (PURPLE STAR-GRASS)

IRIS (FLAG)

Rhizome horizontal. Flowers in a forked corymb, or only 1; spathe-bracts 2 or more, the inner scarious. Perianth segments clawed; outer obovate, spreading or recurved; inner narrower, erect; tube extending somewhat above the ovary. Anthers beneath the arching style-branches. Style 3-parted; base adnate to the perianth tube; branches thin, tip a wide 2-parted crest. Seeds many. — (Gk. *iris* = the rainbow; referring to the colors of the flowers.)

A. Flowers blue or purple.

B. Stem leafless; bracts largely scarious; perianth tube 6-8 mm. long. W. E.

I. missouriensis

BB. Stem leafy; bracts green, not scarious.

C. Leaves 8-16 mm. wide; flowers 2-3; perianth tube 12-15 mm. long; capsule 3.8-4.2 cm. long. U. **I. douglasiana**

CC. Leaves 3-5 mm. wide; flower 1; perianth tube less than 10 mm. long; capsule 1.7-2.5 cm. long. W. **I. tenax**

AA. Flowers white or yellow, sometimes striped or blotched with other colors.

D. Leaves not evergreen; bracts 2.5-5 cm. long.

E. Plant 1-flowered; flower white; outer perianth segments 5-7 cm. long; capsule oblong. (See CC.)

- EE.** Plant 2-flowered; flowers white, blotched and striped with yellow and purple; outer perianth segments 3-3.5 cm. long; capsule globose. C. **I. tenuis**
- DD.** Leaves evergreen; bracts 5-7.5 cm. long.
- F.** Flowers yellow; perianth tube less than 2.5 cm. long, funnelform; spathe bracts short-acuminate. U. **I. bracteata**
- FF.** Flowers white to yellow, with blue veins; perianth tube 5-7.5 cm. long, filiform; spathe bracts long-acuminate. U. **I. chrysophylla**

SISYRINCHIUM (BLUE-EYED GRASS)

Tufted, slender; stem 2-edged or -winged. Leaves grasslike. Flowers in a terminal umbel, or only 1, mostly blue; spathe bracts 2, green or purplish, erect. Perianth segments spreading, alike, mostly aristulate. Filaments united at least at base. Stigmas filiform. Seeds 9-12. — Mostly in wet grassy places. (Gk. *sisyrrinchion* = the name of some Flaglike plant.)

- A.** Inner bracts exceeding the flowers.
- B.** Stem 2-3 mm. wide; perianth 12-14 mm. long, deep blue, with orange yellow eye. W. **S. littorale**
- BB.** Stem 1-1.5 mm. wide; perianth 7-10 mm. long, light blue, without eye. C. **S. sarmentosum**
- AA.** Inner bracts not reaching the tips of the flowers.
- C.** Perianth 4-7 mm. long, white or pale; leaves and stem 0.5-1 mm. wide. E. **S. septentrionale**
- CC.** Perianth 10-22 mm. long, dark blue; leaves and stem 1 mm. or more wide (except *S. occidentale*).
- D.** Stem usually 2-branched. W. **S. biramium**
- DD.** Stem always simple.
- E.** Outer spathe bracts 3-7 cm. long. W. E. **S. macounii**
- EE.** Outer spathe bracts 1.8-3.8 cm. long. W. E. **S. occidentale**

HYDASTYLUS (YELLOW STAR-GRASS)

Black to purplish when dry; stem simple, scapose. Leaves linear, wider at base, somewhat equitant. Spathe bracts 2, inclosing membranous scales; perianth segments not aristulate nor emarginate. Anthers versatile. Capsule more or less 3-angled. — (Gk. *hydor* = water, *stylos* = a style; application not clear.)

- A.** Perianth 8-10 mm. long; leaves 1-3 mm. wide, mostly very dark in drying; anthers 2-2.5 mm. long. W. **H. borealis**
- AA.** Perianth 12-18 mm. long; leaves 2-5 mm. wide, mostly not very dark in drying; anthers 3-4 mm. long. W. **H. brachypus**

ORCHIDACEAE (ORCHID FAMILY)

Herbs, perennial. Leaves parallel-veined, flat. *Flowers* in a spike or a raceme or solitary, *very irregular*. *Perianth superior*, of 6 segments: outer segments 3, alike or nearly so; 2 of the inner segments alike; the third (lip) unlike the other 2, often quite different, usually larger. Stamens adhering to the style and form-

ing a column; perfect anthers 1-2. *Ovary inferior*; stigma concave, upper margin often a beak. Capsule dehiscent, usually 3-celled and loculicidal. *Seeds very many, minute, mostly spindle-shaped.*

A. Plants without green herbage, often reddish, saprophytic or parasitic.

B. Stems white; flowers white, spurless.* C. E. — (Gk. *cephaln* = a head, *anthera* = anther.) **Cephalanthera austinae** (SNOW ORCHID)

BB. Stems more or less purplish; flowers white or reddish, spurred.

CORALLORHIZA (p. 69)

AA. Plants with ordinary green herbage, not saprophytic nor parasitic.

C. Leaf 1; flower 1; plant bulbous. W. E. — (Honor of the Greek goddess Calypso, who once held Ulysses captive.) **Calypso bulbosa** (CALYPSO)

CC. Leaf more than 1; flower usually more than 1; plants mostly not bulbous.

D. Fertile anthers 2; lip an inflated sac.

CYPRIPEDIUM (p. 67)

DD. Fertile anther 1; lip not saclike (except *Epipactis*).

E. Leaves 2.

F. Leaves near middle of stem, opposite.

LISTERA (p. 69)

FF. Leaves basal, alternate.

G. Leaves orbicular; flowers spurred; lip 12 mm. long. W. C. E. — (Gk. *lysis* = a loosening; application doubtful.) **Lysias orbiculata**

GG. Leaves elliptic-lanceolate to oblong; flowers spurless; lip 5 mm. long, yellowish green. E. — (Gk. *liparos* = fat or shining; referring to the smooth leaves.) **Liparis loeselii** (SPURLESS ORCHID)

EE. Leaves more than 2.

H. Flower spurred; spur 2 mm. or more long.

I. Stem leaves abruptly reduced to bracts; leaves withering at flowering; lateral sepals with base adhering to claw of lip; tubers rounded; spike spirally twisted.

PIPERIA (p. 68)

II. Stem leaves gradually reduced to bracts; leaves not withering until fruit is formed; lateral sepals free; tubers elongated, rootlike; spike not spirally twisted.

LIMNORCHIS (p. 68)

HH. Flowers spurless.

J. Leaves without whitish spots or lines; flowers in a dense spike which is somewhat spiral; lip not distinctly saclike at base, with a hornlike projection on each side near base.

SPIRANTHES (p. 69)

JJ. Leaves with whitish spots or lines; flowers in a loose spike or raceme which is not at all spiral; lip saclike at base, without projections near base.

K. Stem leafy at least below; perianth strongly purple-veined. W. E. — (The Greek name.) **Epipactis gigantea** (HELLEBORINE)

KK. Leaves all basal; perianth not purple-veined. W. C. E. — (L. *per* = through, *amium* = love; on account of reputed medicinal properties.)

Peramium decipiens (RATTLESNAKE PLANTAIN)

CYPRIPEDIUM (LADY'S-SLIPPER)

Glandular-pubescent. Leaves large, wide, many-veined, sheathing at base. Flowers in a leafy raceme or solitary, large, showy. Sepals spreading, separate, or 2 of them united under the lip. Petals similar to the sepals

but usually narrower; column with an anther at each side, with petal-like stamen at tip. Pollen masses 4. Stigma disklike, obscurely 3-lobed. — (Gk. *kypris* = Venus, *pedilon* = a shoe; the corolla is slipper-like.)

- A. Stem with more than 2 leaves; lip 1.4 mm. or more long, color not as in AA.
- B. Lip white to rose, veined with purple.
 - C. Flowers 1-3; sepals narrowly linear-lanceolate, brownish; lip 3-5 cm. long.
 - C. E. C. *montanum* (LARGE LADY'S-SLIPPER)
 - CC. Flowers 1-20; sepals widely oval, greenish yellow; lip 1.7-2.1 cm. long.
 - U. C. C. *californicum*
- BB. Lip bright yellow, 1.5-3 cm. long; flowers 1-3. E.
 - C. *parviflorum* (YELLOW LADY'S-SLIPPER)
- AA. Stem with 2 nearly opposite leaves near its middle and 1 small lanceolate bract above them; lip 8-13 mm. long, greenish yellow, with brown or purplish margins.
 - E. C. *fasciculatum* (BROWN LADY'S-SLIPPER)

PIPERIA (ORCHIS)

Stem leafy-bracted. Flowers small, greenish white, in a terminal spike. Sepals and petals 1-3-veined. Pollen masses 2, parallel. Stigma a small beak between the anther cells. — (Meaning not determined.)

- A. Spur slightly longer than the lip. W. C. E. P. *unalaskensis*
- AA. Spur 2-3 times as long as the lip.
 - B. Leaves withering at flowering time; spike 10-30 cm. long; upper sepals lanceolate. W. C. E. P. *elegans*
 - BB. Leaves withering before flowering time; spike 4-10 cm. long; upper sepals ovate. W. P. *michaeli*

LIMNORCHIS (ORCHIS)

Stem leafy. Flowers small, greenish or white, in a terminal spike. Sepals and petals 3-7-veined, free, spreading; lip entire. Pollen masses 2, parallel. Stigma beak without appendages. — (Gk. *limne* = a swamp or pool, *orchis* = the old Greek name of some of these plants.)

- A. Flowers green or purplish.
 - B. Spur only $\frac{1}{4}$ - $\frac{1}{2}$ as long as the lip; lip linear; spike long, 1-3 dm., not dense; flowers purplish. W. C. E. L. *stricta*
 - BB. Spur equaling or exceeding the lip; lip lanceolate; spike short, dense; flowers green. C. E. L. *viridiflora*
- AA. Flowers white or whitish.
 - C. Lip linear; spike not dense.
 - D. Lower leaves oblanceolate, obtuse; upper leaves lanceolate, acute; lateral sepals lanceolate, acute; lip 6-8 mm. long. C. E. L. *sparsiflora*
 - DD. Leaves all linear to linear-lanceolate, acute to acuminate; lateral sepals ovate, acuminate; lip 12 mm. long. U. L. *aggregata*
 - CC. Lip lanceolate; spike lax or dense.
 - E. Spur shorter than the lip, or very little longer; flowers 12-14 mm. long. W. C. E. L. *dilatata*
 - EE. Spur $\frac{1}{4}$ - $\frac{1}{2}$ longer than the lip; flowers 15-20 mm. long. W. C. E. L. *leucostachys*

SPIRANTHES (LADIES' TRESSES)

Erect; roots fleshy-fibrous or tuberous. Stem leafy. Flowers small. Upper sepals cohering to the petals. Lip dilated, spreading. Pollen masses 1 pair. — In wet places. (Gk. *speira* = a coil, *anthos* = a flower; referring to the spirally twisted racemes.)

A. Perianth about 8 mm. long; lip much dilated at apex, basal swellings small.
W. C. E. **S. romanzoffiana**

AA. Perianth about 6 mm. long; lip little dilated at apex, basal swellings large.
W. C. E. **S. porrifolia**

LISTERA (TWAYBLADE)

Small. Leaves nearly opposite, sessile. Flowers in a terminal raceme, spurless, greenish or madder-purple. Sepals and petals nearly alike, free. Lip longer than the sepals, 2-lobed or 2-cleft at summit. Pollen masses 1 pair. Stigma with a somewhat rounded beak. — In dense damp woods. (Honor of M. Lister, an English naturalist.)

A. Raceme glabrous or nearly so; lip 2-cleft to about the middle, about 4-5 mm. long.
W. C. E. **L. cordata**

AA. Raceme densely glandular-pubescent; lip 2-lobed or merely retuse, the divisions less than $\frac{1}{4}$ the distance to the base.

B. Leaves rounded to truncate at base; petals 3-4 mm. long; lip 5 mm. long; capsule ovoid. W. C. **L. caurina**

BB. Leaves cordate to reniform at base; petals 4-6 mm. long; lip 9 mm. long; capsule obovoid. C. E. **L. convallarioides**

CORALLORHIZA (CORAL ROOT)

Saprophytes or root parasites; roots coral-like, branched; stems scapose, simple. Leaves sheathlike, membranous, white to red, without green. Flowers in a terminal raceme, more or less showy. Lateral sepals united at base into a short spur or a swelling. Petals about as long as the sepals, 1-3-veined; lip 1-3-ridged; pollen masses 2 pairs. — In dense woods. (Gk. *korallion* = coral, *riza* = a root; on account of the knotted, fungus-covered roots.)

A. Sepals and petals 6-8 mm. long; spur present.

B. Sepals and petals 3-veined; spur prominent; capsule oblong-cylindric.

C. Lip crenulate, with 2 lobes at base; spur wholly adnate to the ovary. W. C. E. **C. multiflora**

CC. Lip not crenulate, with or without 2 basal lobes; spur free for its apical half.
W. C. **C. mertensiana**

BB. Sepals and petals 1-veined; spur very short, wholly adnate to the ovary; lip 2-toothed or 2-lobed above the base; capsule oblong-elliptical. E. **C. corallorhiza**

AA. Sepals and petals 12-17 mm. long, 3-veined; spur none. W. E. **C. striata**

DICOTYLEDONS

SALICACEAE (WILLOW FAMILY)

Trees or shrubs; bark bitter. Leaves simple, alternate. *Flowers* of both sexes *in aments, dioecious, naked*. Stamens long, 1 to many. Pistil 1; ovary 1-celled; stigmas 2, simple or 2-4-cleft. *Fruit a capsule, 2-4-valved. Seeds many, with a tuft of hairs at one end; hairs long, silky, mostly white.*

A. Ament scales entire; stamens 1-10; flowers with 1-2 glandlike projections at base; buds with only 1 bud scale. **SALIX** (p. 70)

AA. Ament scales lacerate or sharply serrate at tip; stamens 4-60; flowers with a cuplike disk at base; buds with more than 1 bud scale. **POPULUS** (p. 72)

SALIX (WILLOW)

Trees or shrubs. Leaves short-petioled. Staminate aments dense; stamens 1-10, usually 2. Ovary sessile or short-stalked; stigmas 2, entire to 2-cleft. Capsule mostly 2-valved. — (Celtic *sal* = near, *lis* = water; referring to the usual habitat.)

A. Ament scales pale yellow, deciduous. .

B. Trees, with furrowed bark; leaves closely serrulate; stamens 2-9.

C. Leaves without glands where petiole joins blade.

D. Leaves deep green beneath when mature, narrowly lanceolate to linear-lanceolate; stipules semicordate; stamens 3-5. E. — Leaves medicinal.

S. nigra (BLACK WILLOW)

DD. Leaves pale or glaucous beneath, even when mature.

E. Leaves narrowly lanceolate or linear-lanceolate; stipules narrow; twigs strikingly long and pendulous; stamens 2; cultivated. W. E.

S. babylonica (WEEPING WILLOW)

EE. Leaves lanceolate or broadly lanceolate; twigs not strikingly long; stamens 5-9.

F. First few leaves at base of twigs plainly widest below the middle of the blade; stipules reniform; petioles slender, nearly terete. E.

S. amygdaloides (PEACH WILLOW)

FF. First few leaves at base of twigs mostly widest at or above the middle of the blade; stipules ovate; petioles wide, plainly grooved. W. C. E.

S. laevigata (SMOOTH WILLOW)

CC. Leaves with glands where petiole joins blade. W. C. E.

S. lasiandra (GLAND WILLOW)

BB. Shrubs or trees, with unfurrowed bark; leaves remotely serrulate or entire; stamens 2.

G. Leaves linear or linear-lanceolate; blade widest below the middle, entire or remotely denticulate; pistillate aments 10-20 mm. wide.

- H. Leaves canescent or silky at least beneath; pedicel of capsule 0-0.7 mm. long.
- I. Stigma short and thick; stipules none; twigs glabrous.
- J. Capsule glabrous; leaves canescent on both surfaces or silky-tomentose beneath, rarely on both sides on very vigorous shoots. W. E. *S. exigua*
- JJ. Capsule pubescent; leaves appressed-silky on both sides. E. *S. argophylla* (SPOTTED WILLOW)
- II. Stigma long and slender; stipules present, acute, deciduous; twigs hoary-pubescent. W. *S. sessilifolia* (SILVER-LEAF WILLOW)
- HH. Leaves glabrous on both sides; pedicel of capsule 0.5-1.5 mm. long. E. *S. fluviatilis* (SANDBAR WILLOW)
- GG. Leaves elliptical to oblanceolate; blade widest at or above the middle, rather closely denticulate; pistillate aments 7-8 mm. wide. W. E. *S. melanopsis* (DUSKY WILLOW)
- AA. Ament scales not pale yellow, mostly brown to black, at least the tip darker, persistent.
- K. Aments sessile, or their peduncles naked or merely with bracts.
- L. Leaves glabrous beneath; stipules present; capsule glabrous.
- M. Leaves glaucous, or at least distinctly pale beneath.
- N. Most of the leaf blades widest below the middle. W. E. *S. cordata* (HEART WILLOW)
- NN. Most of the leaf blades widest above the middle.
- O. Bracts below the ament oblanceolate; scales long-hairy, obtuse or rounded. W. E. *S. piperi*
- OO. Bracts below the ament lanceolate; scales glabrous, acute. E. *S. mackenziana*
- MM. Leaves deep green on both sides, never pale beneath.
- P. Leaves elliptic-oblong to oblong; ament peduncles 1-2 mm. long; stipules ovate to lanceolate. E. *S. pseudomyrsinites*
- PP. Leaves ovate to obovate; ament peduncles 2.5-4 mm. long; stipules lunate to broadly ovate. E. *S. pyrifolia* (PEAR WILLOW)
- LL. Leaves either hairy beneath or else stipules none; capsule hairy.
- Q. Leaves densely silvery-hairy beneath; style elongated; capsule silvery-hairy.
- R. Twigs densely covered with a bluish bloom, glabrous, brownish; stipules none or on vigorous shoots lanceolate. C. E. *S. subcoerulea*
- RR. Twigs not dense with bloom, either yellow or hairy; stipules none or on vigorous shoots lunate or reniform.
- S. Stamens 2; twigs yellow, glabrous; staminate aments 1.2-2.5 cm. long, their scales acute. E. *S. bella*
- SS. Stamen 1; twigs brownish, hairy; staminate aments 2.5-5 cm. long, their scales obtuse. W. C. E. *S. sitchensis* (SITKA WILLOW)
- QQ. Leaves often hairy beneath but not silvery-hairy; style short (except in *S. phylicifolia*); capsule pubescent or tomentose but not silvery-hairy.
- T. Leaves glabrous on both sides, margin not revolute; style 1-1.5 mm. long. C. *S. phylicifolia* (TEA-LEAVED WILLOW)
- TT. Leaves either hairy beneath or else margin revolute; style 0-0.3 mm. long.
- U. Tall shrubs, 3-15 m. high, not alpine; leaves 2.5-15 cm. long; aments stout, 2.5-7.5 cm. long; capsule 7-9 mm. long.
- V. Capsule pubescent; scales black. W. C. E. *S. scouleriana* (SCOULER WILLOW)
- VV. Capsule tomentose; scales yellow. W. *S. hookeriana* (HOOKER WILLOW)
- UU. Low shrubs, less than 1 m. high, alpine; leaves 0.7-4.5 cm. long; aments not particularly stout, less than 2.5 cm. long; capsule 2.5-5 mm. long.

- W. Stems ascending, 30-90 cm. high; leaves long-hairy beneath, 3-4.5 cm. long, 2-3.5 cm. wide, obscurely crenulate; aments 3-3.5 cm. long. E. *S. vestita*
- WW. Stems creeping, 3-10 cm. high; leaves glabrous beneath, 0.7-2.5 cm. long, 0.4-1.5 cm. wide, entire; aments 1-2 cm. long.
- X. Leaves 15-25 mm. long, 10-15 mm. wide; aments 1-2 cm. long, many-flowered. C. *S. saximontana*
- XX. Leaves 7-12 mm. long, 4-8 mm. wide; aments 0.5-1 cm. long, 3-6-flowered. C. *S. nivalis*
- KK. Aments on leafy peduncles.
- Y. Shrubs 1.5 m. or less high (except *S. lemmoni*, *S. barclayi*, and *S. macrostachya*); ament scales wider than linear, obtuse or acute, brown or gray-brown or black, not reddish at tip; capsule peduncle 2-5 mm. long.
- Z. Stipules present, rather large on vigorous shoots (except *S. wolfii*); stigma entire.
- a. Leaves lanceolate; scales of aments black. E. *S. lemmoni*
- aa. Leaves either ovate-lanceolate or else widest at or above the middle of the blade; scales of aments not black.
- b. Leaves glabrate above, glabrous and glaucous beneath, crenate or serrulate. W. C. E. *S. barclayi* (BARCLAY WILLOW)
- bb. Leaves quite hairy on both sides, not glaucous beneath.
- c. Stipules large, ovate. W. C. E. *S. commutata*
- cc. Stipules small or none.
- d. Twigs ash-colored, hairy; pistillate aments 2.5-5 cm. long. E. *S. macrostachya*
- dd. Twigs yellow-brown, glabrous; pistillate aments 1-2.5 cm. long. C. E. *S. wolfii*
- ZZ. Stipules none or very small; stigma not entire.
- e. Erect shrubs, bog plants, alpine or low-land, 4 dm. or less high; mature leaves mostly 3-6 cm. long. W. C. E. *S. myrtilloides* (BOG WILLOW)
- ee. Depressed or creeping shrubs, rock plants, alpine, less than 1 dm. high; mature leaves mostly 1-3 cm. long.
- f. Leaves 2-4 cm. long, pale beneath, broadly elliptic to obovate. E. *S. petrophila* (ROCK WILLOW)
- ff. Leaves 1-1.2 cm. long, deep green or slightly pale beneath, narrowly elliptic to obovate. C. *S. tenera* (SMALL-LEAVED WILLOW)
- YY. Shrubs 2-5 m. high; ament scales linear-oblong, acute, tawny, reddish at tip; capsule peduncle 0-1.5 mm. long.
- g. Leaves elliptical-oval; peduncle of ament 2-5 mm. long; twigs without bloom. E. *S. bebbiana* (BEBB WILLOW)
- gg. Leaves linear-oblong; peduncle of ament 1.5-2.5 mm. long; twigs with bloom. W. E. *S. georgiana* (GEYER WILLOW)

POPULUS (POPLAR)

Trees; bud scales resinous. Leaves wide, petioled; stipules minute, fugaceous. Disk cup-shaped, oblique. Staminate aments dense, pendulous; stamens 6-40. Pistillate aments sometimes raceme-like: ovary sessile; style short; stigmas 2-4, entire or 4-lobed. Seed hairs often very long and conspicuous. — (*L. populus* = the common people; planted in public places by the Romans.)

- A. Petiole strongly flattened laterally.
- B. Tree not strikingly narrow for its height; branches spreading, their angle with the stem more than 45°; leaves ovate to suborbicular, short-pointed. W. E. *P. tremuloides* (ASPEN)

BB. Tree strikingly narrow for its height; branches nearly erect, their angle with the stem less than 45° ; leaves broadly deltoid, abruptly acuminate. W. E. — Common shade-tree. *P. dilatata* (LOMBARDY POPLAR)

AA. Petiole terete or channeled, scarcely or not at all flattened laterally.

C. Leaves persistently and densely white-tomentose beneath, 3-5-lobed or irregularly dentate. W. — Common shade-tree. *P. alba* (SILVER-LEAF POPLAR)

CC. Leaves glabrous or nearly so when mature, crenate or crenulate.

D. Petiole 2.5-5 cm. long; leaves mostly ovate-lanceolate, rounded or subcordate at base; capsule 3-valved. W. E. — Wood used in making paper.

P. trichocarpa (COTTONWOOD)

DD. Petiole 0.6-1.3 cm. long; leaves mostly lanceolate, rounded or obtuse at base; capsule 2-valved. E. *P. angustifolia* (NARROW-LEAVED COTTONWOOD)

MYRICACEAE (SWEET-GALE FAMILY)

Shrubs or trees. *Leaves* alternate, *simple*, *resinous-dotted*. *Flowers* in aments, *monoecious* or *dioecious*, *naked*, only 1 in the axil of each scale. Stamens 4-8, on the receptacle; anthers ovate, 2-celled. Ovary 1-celled, subtended by 2-4 bractlets; style very short; stigmas 2, linear. *Fruit* a small *drupelet*. *Seed* 1. — Only the following genus.

MYRICA

Leaves oblanceolate, dentate. Staminate aments oblong or nearly cylindric. Pistillate aments ovoid or subglobose. Fruit globose or ovoid, waxy. — (Gk. *myrike* = the name of the Tamarisk.)

A. Shrub, 0.3-2 m. high; leaves deciduous, 2-5 cm. long; staminate aments 12-21 mm. long. W. *M. gale* (SWEET GALE)

AA. Tree, 3-6 m. high; leaves evergreen, 5-10 cm. long; staminate aments 6-10 mm. long. W. *M. californica* (WAX MYRTLE)

BETULACEAE (BIRCH FAMILY)

Shrubs or trees. Leaves alternate, petioled, simple; stipules fugaceous. *Flowers* *monoecious* or rarely *dioecious*, in aments or *headlike clusters*; staminate aments pendulous; *pistillate aments* *spikelike* or *headlike* or *budlike*. *Flowers* 1-4 in each scale axil; perianth membranous or none, entire or 2-4 toothed; stamens 2-10; style 2-cleft or divided. *Fruit* a *nut* or *samara*, flat or ovoid-globose, mostly 1-celled and 1-seeded.

A. Leaves densely stiff-hairy making them velvety to the touch; pistillate inflorescence budlike, 5-10 mm. long; fruit a nut, 1 cm. or more in diameter, solitary or 2-3 in a group, each inclosed in a leafy involucre; shrub. W. C. E. — (Gk. *korys* = a helmet; referring to the involucre.) *Corylus californica* (HAZEL)

AA. Leaves not densely stiff-hairy nor velvety to the touch; pistillate inflorescence amentlike or conelike; fruits small, many grouped together in cones or aments, without involucre; shrubs or trees.

B. Bark often cracking in the direction of the tree circumference; lenticels elongated in the direction of the tree circumference; winter buds covered by imbricate scales; stamens 2, bifid; pistillate aments solitary; scales of pistillate aments thin, 3-lobed. **BETULA** (p. 74)

BB. Bark cracking up and down the tree or not at all; lenticels not elongated in the direction of the tree circumference; winter buds inclosed by 2 scales; stamens 4, not bifid; pistillate aments or cones in racemes; scales of pistillate aments or cones thick, entire or erose or 5-toothed. **ALNUS** (p. 74)

BETULA (BIRCH)

Shrubs or trees. Leaves serrate or dentate, sometimes also lobed. Flowers in aments, expanding before the leaves; aments monoecious. Staminate flowers about 3 in each scale axil, subtended by 2 bractlets; scales entire; perianth membranous, usually 4-toothed; filaments 2-cleft, each fork bearing 1 pollen sac. Pistillate flowers 1-3 on each scale; perianth none; ovary sessile; styles 2. Fruit a nutlet or samara, small, flat. — (The Latin name.)

A. Branchlets not or very little warty-glandular. W. C. E.

B. occidentalis (WESTERN BIRCH)

AA. Branchlets very much warty-glandular.

B. Shrub or small tree, 3-12 m. high; leaves sparsely pubescent; body of the fruit much narrower than the wings. E. **B. microphylla** (ROCKY-MOUNTAIN BIRCH)

BB. Shrub, 1-3 m. high; leaves glabrous; body of fruit as wide or wider than the wings. W. C. E. **B. glandulosa** (PEAT-BOG BIRCH)

ALNUS (ALDER)

Shrubs or trees. Leaves dentate or serrate, sometimes also slightly lobed. Flowers in aments; aments monoecious. Staminate aments fascicled, long-cylindric; flowers 3 or 6 on each scale; perianth mostly 4-parted. Pistillate aments oval or elliptic; flowers 2-4 on each scale; perianth none; ovary sessile; styles 2. Fruit flat. — (The Latin name.)

A. Leaves doubly dentate or serrate, or more or less lobed and serrate; stamens 4.

B. Teeth of leaves almost equilateral triangles; tip of tooth almost a right angle, often with a gland; mature pistillate ament or cone 12-25 mm. long; leaves rusty-pubescent beneath at least on the veins. W. C. **A. oregona** (RED ALDER)

BB. Teeth of leaves rather narrow; tip of tooth acuminate or narrowly acute, without gland; mature pistillate ament or cone 8-15 mm. long.

C. Winter buds 12-13 mm. long, acuminate; leaves somewhat brown-hairy along the veins beneath; stipules oblong to spatulate, 6-7 mm. long; pistillate aments inclosed during the winter. W. C. E. **A. sinuata** (LATE ALDER)

CC. Winter buds 6-9 mm. long, obtuse; leaves without brown hairs; stipules ovate, 12-13 mm. long; pistillate aments naked during the winter. C. E.

A. tenuifolia (MOUNTAIN ALDER)

AA. Leaves simply serrulate, not at all lobed; stamens 1-3; mature pistillate ament or cone 8-13 mm. long. E. **A. rhombifolia** (WHITE ALDER)

FAGACEAE (BEECH FAMILY)

Shrubs or trees. Leaves alternate, petioled, simple, pinnately veined; stipules deciduous or none. *Flowers monoecious*, small. *Staminate flowers in aments or heads*; perianth 4-7-lobed; stamens 4-20. *Pistillate flowers solitary or in clusters*, each cluster of 1 or more subtended by an *involucre* of bracts which become a *cup or bur*; perianth 4-8-lobed, adnate to the ovary; ovary 3-7-celled; styles as many as the ovary cells. *Fruit 1-3 nuts*. Seed 1.

A. Leaves serrate or dentate or entire, not lobed; filaments many times as long as the anthers; pistillate flowers on the bases of the staminate aments.

B. Leaves entire, coated beneath with yellow persistent scales; involucre inclosing 1-3 nuts, very prickly with branched prickles. C. E. — (*Castania* is the genus of the chestnut; Gk. *opsis* = like; hence chestnut-like.)

Castanopsis chrysophylla (CHINQUAPIN)

BB. Leaves entire or serrate or dentate, without scales beneath; nuts solitary; involucre covering only the base of the nut, not prickly or at least the prickles not branched. W. — (Perhaps from L. *pascere* = to feed; on account of the food in the acorns.)

Pasania densiflora (CHESTNUT OAK)

AA. Leaves often deeply lobed but in some serrate or entire; filaments not longer than the anthers; pistillate flowers not on the staminate aments; fruit a single nut (acorn), partly inclosed in a scaly cup which is not prickly. **QUERCUS** (p. 75)

QUERCUS (OAK)

Shrubs or trees. Leaves deciduous or evergreen. Staminate flowers in aments, 1 on each scale; aments slender, many-flowered: perianth mostly 6-lobed: stamens 6-12. Pistillate flowers solitary: perianth adherent to the ovary: ovary usually 3-celled; styles as many as the ovary-cells. — (Celtic *quer* = fine, *cuez* = a tree; because the sacred Mistletoe grew upon it.) Wood fine for floors and furniture.

A. Leaves not lobed, entire or sinuate or serrate or dentate, evergreen.

B. Leaf-blade widest above rather than below the middle; acorns maturing the first season, shell glabrous inside. W. *Q. sadleriana*

BB. Leaf-blade widest below rather than above the middle; acorns maturing the second season, shell hairy inside. W. C. E. *Q. chrysolepis* (LIVE OAK)

AA. Leaves lobed, deciduous.

C. Leaf-lobes mostly sharp-pointed; acorns maturing the second season, shell silky-tomentose on the inside; stamens 4-6. W. C. *Q. californica* (BLACK OAK)

CC. Leaf-lobes mostly with rounded tips; acorns maturing the first season, shell glabrous on the inside; stamens 5-10.

D. Shrubs or trees, 45 m. high or less; notches of the leaf-blades rounded. W.

Q. garryana (WHITE OAK)

DD. Shrubs, 2 m. high or less; notches of the leaf-blades mostly acute. W. C.

Q. oerstediana (SCRUB OAK)

ULMACEAE (ELM FAMILY)

Shrubs or trees. Leaves alternate, pinnately veined but often with 3-5 chief veins from the base. Flowers in lateral or axillary clusters, or the pistillate flowers solitary, small. Perianth 3-9-parted or of 3-9 distinct segments. Stamens as many as the perianth-segments and opposite them. Ovary 1-celled or rarely 2-celled, superior; styles or stigmas 2. Fruit a samara or drupe or nut. Seed 1.

A. All flowers in clusters; fruit dry, winged; leaves with 1 vein from the base.
W. — Several eastern species cultivated for shade trees,* but none wild. — (The Latin name.) **Ulmus** (ELM)

AA. Pistillate flowers solitary; fruit a drupe; leaves with 3 chief veins from the base.
E. — An eastern species, *C. occidentalis*, is sometimes planted for shade. (The Latin name of an African *Lotus* on account of resemblances in fruit.)

Celtis douglasii (HACKBERRY)

MORACEAE (MULBERRY FAMILY)

Herbs or shrubs or trees; *juice milky* or watery. Stipules present. Flowers monoecious or dioecious; staminate flowers in panicles or spikes; pistillate flowers in spikes or heads or cymes, sometimes flowers solitary; both kinds of clusters axillary. Perianth 4-5-parted. Stamens as many as the perianth-segments. Ovary *superior*, 1-celled; styles 1-2. Fruit various, either *conelike* or *blackberry-like*. Seed 1.

A. Shrubs or trees; sap milky; leaves alternate; stipules fugacious; fruit a berry.
E. — Berries edible. (L. *morus* = the name of the Mulberry.)

Morus rubra (RED MULBERRY)

AA. Twining herbs; sap watery; leaves opposite; stipules persistent; fruit conelike. W. E. — Fruits used in the making of beer. (L. *humus* = the ground; because prostrate when unsupported.) **Humulus lupulus** (CULTIVATED HOP)

URTICACEAE (NETTLE FAMILY)

Herbs; juice watery. *Leaves alternate or opposite, simple; pinnately veined but with a number of chief veins from the base; petioles present. Flowers monoecious or dioecious or polygamous, small, greenish, the clusters axillary. Perianth 2-5 cleft or -parted, or of 2-5 distinct segments. Stamens as many as the segments or lobes of the perianth, opposite them. Ovary superior, 1-celled; style 1. Fruit an akene. Seed 1.*

* See Gray's New Manual of Botany. American Book Co.

- A. Perennial; herbage with stinging hairs; leaves opposite, coarsely serrulate; stipules present; flowers not involucre. **URTICA** (p. 77)
- AA. Annual; herbage without stinging hairs; leaves alternate, entire; stipules none; flowers involucre by leafy bracts. **PARIETARIA** (p. 77)

URTICA (NETTLE)

Herbs, tall. Stem 4-angled. Flowers small; clusters paired, racemes or spikes or heads. Perianth 4-parted. Staminate flowers with 4 stamens and a rudimentary ovary. — (L. *urere* = to burn; referring to the sensation produced by the stinging hairs.) The stinging hairs produce intense itching.

- A. Leaves soft-pubescent on both sides; staminate flower-clusters nearly equaling the leaves. E. **U. holosericea** (HAIRY NETTLE)
- AA. Leaves glabrous above or nearly so, sparsely pubescent beneath; staminate flower-clusters hardly exceeding the petiole.
- B. Inner perianth-segments rather widest below their middle, in fruit shorter than the akene; akene 1–1.5 mm. long. W. C. E. **U. lyallii** (COMMON NETTLE)
- BB. Inner perianth-segments rather widest above their middle, in fruit about 3 times as long as the akene; akene 0.5–0.7 mm. long. W. C. E. **U. breweri**

PARIETARIA (PELLITORY)

Herbs, low, diffuse or tufted. Flowers polygamous; clusters headlike, involucre by leafy bracts. Perianth of staminate flowers 4-parted or of 3–4 distinct segments. Perianth of pistillate and perfect flowers tubular or campanulate, 4-lobed. — In dry open places. (L. *paries* = a wall; because some species prefer to grow on old walls.)

- A. Leaves oblong-lanceolate; involucre 2–3 times as long as the flowers. E. **P. pennsylvanica**
- AA. Leaves ovate; involucre about equaling the flowers. W. E. **P. debilis**

SANTALACEAE (SANDALWOOD FAMILY)

Herbs, *sometimes root parasites*. Leaves entire. Flowers perfect, mostly greenish. *Perianth adnate to base of ovary or to disk*. Stamens as many as the perianth lobes and opposite them. Ovary 1-celled; placenta central; *style* 0–1. *Fruit a drupe*. Seed 1. — Only the following genus.

COMANDRA (COMANDRA)

Perennial, erect, glabrous, mostly parasitic on the roots of other plants. Leaves alternate, almost sessile. Flower clusters cymose, bractless. Perianth campanulate, 4–5-lobed. Anthers attached to the calyx lobes each by a tuft of hair. — (Gk. *komn* = hair, *andros* = a man or male; referring to the anther hairs.)

- A. Leaves pallid, acute, 3-7 mm. wide; flowers many, corymbosely clustered near the top of the stem; style slender.
- B. Leaves oblong, pale green beneath; fruit globose, constricted above the line at which the perianth joins it. W. E. **C. umbellata**
- BB. Leaves linear or narrowly lanceolate, or those of the main stem oblong, glaucous beneath; fruit ovoid-oblong, constricted at the line at which the perianth joins it. E. **C. pallida** (PALE COMANDRA)
- AA. Leaves green, obtuse, 7-13 mm. wide; flowers few, on axillary peduncles; styles short. E. **C. livida** (GREEN COMANDRA)

LORANTHACEAE (MISTLETOE FAMILY)

Herbs or shrubs, green or yellowish- or olive- or brownish-green, ours *parasitic on woody plants*. Leaves *opposite*, in some merely *scales*. Flowers dioecious, regular. *Perianth* of similar parts; *tube adherent to the ovary*; limb entire or toothed or lobed. Stamens 2-6. Style 0-1; *stigma entire*. Fruit a berry. Seed 1.

- A. Herbs, parasitic on branches of *Abies* or *Pseudotsuga* or *Tsuga* or *Larix* or *Pinus*; anthers 1-celled; berry stalked; inflorescence not bracted. **RAZOUMOFSKYA** (p. 78)
- AA. Shrubs, parasitic on *Quercus* or *Juniperus* or *Libocedrus*; anthers 2-celled; berry sessile; inflorescence bracted. **PHORADENDRON** (p. 78)

RAZOUMOFSKYA (SMALL MISTLETOE)

Herbs, perennial, parasitic on branches of conifers, fleshy, small or minute, glabrous; branches 4-angled. Leaves scalelike, opposite. Flowers solitary or several together in the axils of the scales. Perianth of staminate flowers 2-4-parted; stamens usually 1 on each perianth lobe; anthers sessile. Perianth of pistillate flowers with 2-parted limb. — (Honor of A. Razoumofski, a Russian botanist.)

- A. On *Pinus contorta* or *Pinus flexilis*; staminate plants 5-10 cm. high, 0.5-2 mm. thick at base; pistillate plants much smaller; staminate flowers dichotomously paniculate, nearly all terminal on pedunclelike joints. W. E. **R. americana**
- AA. On trees other than those in A; staminate flowers nearly all axillary, forming simple or compound spikes.
- B. On *Pinus ponderosa*; stems 5-13 cm. high, 4-5 mm. thick at base. W. **R. campylopoda** (SNAPPERS)
- BB. On conifers other than *Pinus*; stems 0.8-4 cm. high. C. E. **R. douglasii**

PHORADENDRON (MISTLETOE)

Shrubs, parasitic on trees, yellowish-green or olive-green; twigs brittle, usually jointed. Leaves flat, coriaceous. Flowers small in bracted spikes. Perianth 2-4-lobed. Anther 1 at the base of each perianth lobe, sessile, transversely 2-celled. Ovary inferior; stigma entire. — (Gk. *phor* = a thief, *dendron* = a tree; because it is parasitic on trees.)

A. On oaks; even the younger branches terete; leaves orbicular to spatulate, 1.2-4.2 cm. long, not scales, permanently villous; berry white. W.

P. villosum (OAK MISTLETOE)

AA. On junipers or Incense Cedar; younger branches 4-angled; leaves broadly triangular, mere scales, ciliate; berry white or red. W. E. **P. juniperinum**

ARISTOLOCHACEAE (BIRTHWORT FAMILY)

Herbs, with rhizome-like stem. *Leaves* alternate, petioled, *cordate or reniform*; stipules none. *Flowers* solitary, *perfect*, mostly large, regular. Perianth 3-lobed. Stamens 12, on the ovary. *Ovary wholly or partly inferior*. *Fruit a capsule, 6-celled*. Seeds many. — Only the following genus.

ASARUM (WILD GINGER)

Rhizome ginger-like to taste, bearing several scales and 1-2 leaves. Leaves entire, evergreen; petioles very long. Flowers brown-purple or mottled, on long peduncles. — In damp forests. (Said to be from Gk. *a* = not, *seiro* = to bind; because it withers too easily to use for garlands.)

A. Leaves not marked with white; free tip of connective much shorter than the anther; ovary about 8 mm. wide; seed 3 mm. long. W. C. E. **A. caudatum**

AA. Leaves marked with white above; free tip of connective 1-2 times as long as the anther; ovary about 12 mm. wide; seed 4 mm. long. W.

A. hertwigi (MOTTLED WILD GINGER)

POLYGONACEAE (BUCKWHEAT FAMILY)

Herbs, or herbaceous twining vines, or shrubs; juice acid or acrid. Stems plainly jointed when long enough. Leaves simple, mostly entire; *stipules sheathing and united*, or none. Flowers regular. Perianth 2-6-cleft or -parted. Stamens 2-9; filaments distinct. *Ovary superior*, 1-celled; ovule 1; style 2-4-cleft or -parted. Fruit an *akene, lens-shaped or 3-angled* or rarely 4-angled. — No keys to species in unimportant and difficult genera. (F. & R. pp. 130-140.)

A. Lower leaves fan-shaped, 2-lobed, distinctly toothed, 4-13 mm. long; all leaves opposite, scattered along the stem. W. — (Gk. *pleron* = a wing, *stige* = a covering; referring to the bractlike involucre inclosing the solitary flowers.)

Pterostegia drymarioides

AA. Leaves never fan-shaped, not lobed, rarely faintly serrulate, often more than 13 mm. long, alternate or whorled in almost all species, often in basal tufts.

B. Stipules none; flowers involucrate; juice nearly tasteless; styles 3; stamens 9.

C. Involucre 1-flowered, coriaceous; its teeth cuspidate, often hooked; annual.

Chorizanthe

CC. Involucre several-flowered, either herbaceous or without sharp point to its teeth.

- D. Akene lens-shaped; involucre 3-4-lobed, shortly awned; annual. E. — (Gk. *oxys* = sharp, *theke* = sac or case; referring to the pointed anthers.)

Oxytheca dendroidea

- DD. Akene 3-angled; involucre 4-8-lobed, pointless; annual or perennial.

ERIOGONUM (p. 80)

- BB. Stipules scarious and sheathing; flowers not involucre; juice usually sour or acrid; styles 2-3; stamens fewer than 9 (except sometimes in *Polygonum*).

- E. Leaves kidney-shaped, wider than long; akene orbicular and broadly winged; perianth lobes 4; stigmas 2. W. C. E. — (Gk. *oxys* = sharp or sour; the leaves are sour.)

Oxyria digyna (MOUNTAIN SORREL)

- EE. Leaves not kidney-shaped, longer than wide; akene 3-angled or lens-shaped, not winged; perianth lobes 5-6 (4 in a few); stigmas 2-3.

- F. Perianth lobes 6, outer smaller and reflexed, inner erect and enlarging in fruit (except *R. acetosella* with very sour leaves); stigmas 3, tufted; akene 3-angled.

RUMEX (p. 80)

- FF. Perianth lobes 5, rarely 4 or 6, all about equal and remaining so; stigmas 2-3, capitate; akene 3-angled or lens-shaped.

- G. Plants vines; akene 3-angled.

POLYGONUM (p. 81)

- GG. Plants not vines; akene 3-angled or lens-shaped.

- H. Plants not fleshy; calyx exceeding the mature akene; surface of akene without pinnate striation; basal angles of leaves either projecting downward or else rounded.

POLYGONUM (p. 81)

- HH. Plants rather fleshy; calyx only $\frac{1}{2}$ as long as the akene; mature akenes with pinnate striation on each face; basal angles of leaves pointed, the points projecting outward. W. — Cultivated for honey and flour. (Gk. *phagos* = edible, or the beech; *pyros* = wheat; the seed resembles a beechnut.)

Fagopyrum esculentum (CULTIVATED BUCKWHEAT)

ERIOGONUM (ERIOGONUM)

Herbs or shrubs or shrubbery at base. Stems often tufted. Leaves entire. Flowers in clusters; clusters involucre. Perianth 6-cleft or -parted, usually colored. — Plants mostly of dry plains. (Gk. *erion* = wool, *gonu* = knee; on account of the woolly and jointed stems.)

RUMEX (DOCK)

Herbs, juice more or less sour or acrid. Stem grooved. Leaves alternate, flat or crisped, entire or undulate; stipules sheathing. Flowers small, green, in racemose or paniculate whorls or fascicles. Perianth 6-parted or of 6 distinct segments, more or less colored, the inner often with cork swellings in fruit. Stamens 6. Fruit inclosed in the 3 inner perianth segments. — (L. *rumo* = to suck; because the Romans sucked the leaves to allay thirst.) The leaves of most species are sometimes used for greens.

- A. Coarse plants, usually over 4 dm. high, not strongly sour; flowers not dioecious.

- B. Inner perianth segments in fruit entire, or merely erose or undulate.

- C. None or only 1 of the inner perianth segments in fruit with cork.

- D. Inner perianth segments in fruit 15-37 mm. wide, 20-40 mm. long, without corks; leaves flat. E.

R. venosus (BIG-SEED DOCK)

- DD. Inner perianth segments in fruit 4-9 mm. wide, 6-10 mm. long.
 E. All inner perianth segments in fruit without cork.
 F. Leaves crisped, oblong, truncate at base. W. E.
 R. occidentalis (WESTERN DOCK)
 FF. Leaves flat, lanceolate, rounded at base. E. *R. hesperius*
 EE. One inner perianth segment in fruit with cork. E.
 R. patientia (PATIENCE DOCK)
 CC. Each inner perianth segment in fruit with a cork.
 G. Inner perianth segments in fruit 3-6 mm. wide.
 H. Stems tufted, ascending; leaves flat, not crisped. W. E.
 R. mexicanus (WILLOW DOCK)
 HH. Stems mostly not tufted, erect; leaves crisped at margin. W. E.
 R. crispus
 GG. Inner perianth segments in fruit scarcely 2 mm. wide; leaves somewhat
 crisped. W. *R. conglomeratus* (RING-SEED DOCK)
 BB. Inner perianth segments in fruit with slender teeth.
 I. Perennial; teeth of inner perianth segments more than 4, shorter than the seg-
 ments are wide; fruit mostly with 1-2 corks.
 J. Stems sparingly branched; often some of the lower leaves fiddle-shaped;
 inner perianth segments with 10-20 teeth. W. *R. pulcher* (FIDDLE DOCK)
 JJ. Stems branched at every joint; none of the leaves fiddle-shaped; inner
 perianth segments with 6-10 teeth. W. E. *R. obtusifolius* (BITTER DOCK)
 II. Annual; teeth of inner perianth segments 4, longer than the segments are wide;
 fruit with 3 corks. W. C. *R. persicarioides* (GOLDEN DOCK)
 AA. Slender plants, 4 dm. or less high, very sour; flowers dioecious.
 K. Leaves gradually narrowed at base, not hastate, spatulate or lanceolate; pedicels
 jointed at the base; inner perianth segments winged in fruit; akene smooth. C. E.
 R. paucifolius (MOUNTAIN DOCK)
 KK. Leaves hastate, oblanceolate; pedicels jointed at the summit; inner perianth-
 segments not winged in fruit; akene granular. W. C. E. — A bad weed of ranges
 and waste places. *R. acetosella* (FIELD SORREL)

POLYGONUM (KNOTWEED)

Herbs or shrubs, annual or perennial, terrestrial or aquatic. Stems erect or prostrate or climbing or floating. Leaves alternate, sessile or petioled. Inflorescence various, terminal or axillary. Flowers small, normally perfect, green or white or pink or purple; pedicels not jointed. Perianth 4-6-parted or -cleft. Stamens 3-9; filaments glabrous. Style 2-3-parted or -cleft. Fruit lens-shaped or 3-angled, rarely 4-angled. — (Gk. *polys* = many, *gonu* = knee, joint; because the stems are distinctly many-jointed.)

- A. Plants erect to prostrate, but not vines; leaves cordate to attenuate at base.
 B. Leaf blade jointed to the petiole (except those included in CC), less than 1 cm. wide (except one in D); sheath 2-lobed, becoming lacerate; flowers either in axillary fascicles or in spikelike racemes with non-scarious bracts.
 C. Leaf blade not longitudinally 3-veined, jointed to the petiole.
 D. Plants annual, glabrous or not; stems not woody, greenish, mostly striate, not scaly. — Large but difficult group. (F. & R. pp. 136-138.)
 DD. Plants perennial, glabrous; stems shrubby, chestnut-brown; bark loose-scaly.
 E. Seacoast plant, in sandy soil; leaves strongly revolute; sheaths 12-21 mm. long; flowers in subspicate clusters near the ends of the branches. W.
 P. paronychia (SHRUB KNOTWEED)

EE. Mountain plant, in rocky soil; leaves not revolute; sheaths 4-6 mm. long; flowers 2-3 together in the axils of the leaves. C. E.

P. shastensis (SHASTA KNOTWEED)

CC. Leaf blade longitudinally 3-veined, not jointed to the petiole.

F. Akene obovate; spike rather stout.

G. Sheath 6-8 mm. long, its segments rigid; upper leaves reduced. E.

P. greenei

GG. Sheath 2-3 mm. long, its segments not rigid; leaves much the same size throughout. E.

P. parryi

FF. Akene narrowly lanceolate; spike very slender; sheath about 2 mm. long; upper leaves reduced. W. C.

P. californicum

BB. Leaf blades not jointed to the petiole, at least some over 1 mm. wide; sheath not 2-lobed (except *P. alpinum*); flowers in most species in spikelike racemes; bracts small, scarious, or none.

H. Perennial or annual, without rhizomes, mostly lowland plants; sheath cylindric, truncate; stamens 4-8; akenes 3-angled or lens-shaped.

I. Sheaths bristly-ciliate.

J. Sepals dotted with dark glands; annual; akene lens-shaped or 3-angled.

K. Racemes drooping; akene granular or dull. W. E.

P. hydropiper (WATER PEPPER)

KK. Racemes erect; akene smooth, shining. W. E.

P. punctatum (DOTTED SMARTWEED)

JJ. Sepals not dark-dotted.

L. Spike 3-6 cm. long, slender, not dense, interrupted; style 3-cleft; akene 3-angled. W. E.

P. hydropiperoides (MILD WATER PEPPER)

LL. Spike 1.2-3.5 cm. long, thick, dense, not interrupted except sometimes at base; styles 2 or 2-cleft, rarely 3-cleft; akene lens-shaped, rarely 3-angled.

M. Leaves mostly with a dark blotch near the middle; plant glabrous, never aquatic; spikes several. W. E. — A bad weed in cultivated fields.

P. persicaria (LADY'S THUMB)

MM. Leaves not dark-blotched; plant hispid unless in water; spike only 1. W. E.

P. hartwrightii

II. Sheaths nearly or quite without cilia.

N. Annual, in damp places; spikes several.

O. Leaves white-tomentose beneath. E. *P. tomentosum* (WOOLLY SMARTWEED)

OO. Leaves not white-tomentose beneath.

P. Spikes erect; akene orbicular. E.

P. pennsylvanicum

PP. Spikes drooping at least at tip; akene ovoid.

Q. Calyx and style each parted to below the middle. W. E.

P. lapathifolium

QQ. Calyx and style each parted nearly to the base. E. *P. incarnatum*

NN. Perennial, in water or mud; spike only 1.

R. Leaves oblong-elliptic, obtuse; spikes 1.2-2.5 cm. long; peduncles glabrous or nearly so. W. E.

P. amphibium (WATER SMARTWEED)

RR. Leaves ovate, acuminate; spikes 3-10 cm. long; peduncles hispid, often glandular. W. E.

P. emersum (SWAMP SMARTWEED)

HH. Perennial, with horizontal and elongated or cormlike rhizomes, alpine or subalpine plants; sheath oblique; stamens 8; akenes 3-angled.

S. Inflorescence of but 1 spikelike raceme, terminal; plants not growing in water nor particularly wet places.

T. Rhizome elongated; spike bearing flowers throughout. W. C. E.

P. bistortoides

TT. Rhizome cormlike; spike bearing bulblets at base. C. E. *P. viviparum*

SS. Inflorescence of more than 1 cluster, axillary and terminal; plants growing in wet places.

- U. Sheaths 1-12 mm. long; flower clusters mostly axillary.
 V. Sheaths 1-3 mm. long; flowers usually more than 4 in a cluster; perianth segmented to near the base. C. **P. newberryi**
 VV. Sheaths 6-12 mm. long; flowers 2-4 in a cluster; perianth segmented to near the middle. C. E. **P. davisiae**
 UU. Sheaths 13-50 mm. long; flower clusters mostly paniced.
 W. Leaves lanceolate to ovate-lanceolate; perianth white or greenish; akene obovoid. C. E. **P. alpinum**
 WW. Leaves ovate to ovate-lanceolate; perianth white or pinkish; akene ovoid. E. **P. phytolaccaefolium**
 AA. Plants twining or climbing, vines; leaves sagittate or sagittate-cordate.
 X. Annual; stems somewhat rough; outer perianth segments narrowly winged or not at all; akene minutely roughened, dull. W. E. **P. convolvulus** (BLACK BINDWEED)
 XX. Perennial; stems smooth; outer perianth segments broadly winged; akene smooth, shining. W. E. **P. scandens** (FALSE BUCKWHEAT)

CHENOPODIACEAE (GOOSEFOOT FAMILY)

Herbs or shrubs, *often mealy*. Leaves alternate or opposite, simple, entire to lobed, sometimes mere scales or ridges (*Salicornia*); *stipules none*. Flower commonly in paniced spikes, green or greenish, regular or nearly so; *bracts none or green or fleshy*. Perianth none or various; segments alike. Stamens as many as the perianth-segments or fewer, opposite them. *Ovary mostly superior*, 1-celled; styles 1-3. *Fruit a utricle*. Seed 1. — Family too difficult for beginners. Key mostly only to genera. (F. & R. pp. 140-145.)

- A. Leaves not reduced to scales, alternate in nearly all; branches not conspicuously opposite; stems not conspicuously jointed, not very fleshy.
 B. Leaves opposite.
 C. Plants perennial, herbs, not shrubby; flowers perfect; perianth of 5-7 segments. E. — (Gk. *nitron* = native soda, *philos* = loving; from its alkali habitat.) **Nitrophila occidentalis**
 CC. Plants either annual herbs or shrubby perennials; flowers imperfect; perianth none or 2-5-parted. (See F.)
 BB. Leaves alternate.
 D. Herbs, sometimes shrubby at base; leaves entire or not; flowers perfect in most; fertile flowers with perianth in most.
 E. Leaves not linear; perianth segment 1; stamen 1. E. — (Gk. *monos* = 1, *lepis* = a scale; referring to the single perianth segment.) **Monolepis** (MONOLEPIS)
 EE. Either leaves linear, or perianth segments and stamens 2 or more.
 F. Flowers monoecious or dioecious; fertile flowers without perianth; leaves not linear in most. — Often in alkali places. (Gk. *atraxos* = not nourishing; they are weeds.) **Atriplex** (ATRIPLEX)
 FF. Flowers perfect; perianth of 1-5 segments or lobes; leaves various.
 G. Leaves wider than linear. — Common weeds. Some cooked for greens. (Gk. *chen* = a goose, *pous* = a foot; referring to the form of the leaf in some species.) **Chenopodium** (GOOSEFOOT)

- GG.** Leaves linear.
- H.** Leaves flat, not fleshy, not spinelike.
- I.** Stem not hairy, glabrous or slightly mealy; leaves mealy beneath; flowers clustered or paniced, with 2-5-toothed or -parted perianth. (See **G.**)
- II.** Stem more or less villous-pubescent, not mealy; leaves not mealy; flowers solitary in the axils of the reduced upper leaves, naked or with 1 perianth segment. **E.** — (Gk. *koris* = a bug, *sperma* = a seed; the seed is buglike in appearance.) **Corispermum** (BUGSEED)
- HH.** Leaves somewhat terete or angular, sometimes fleshy or spinelike.
- J.** Leaves rigid and prickly-pointed, making the plant prickly to the touch; tumbleweed. **W. E.** — A bad weed, very common in wheat fields. (Diminutive of *L. salsus* = salt; because most of the species grow in saline soil.) **Salsola kali** (RUSSIAN THISTLE)
- JJ.** Leaves not pricklike; plant not prickly to the touch, not a tumbleweed.
- K.** Stem glabrous or somewhat pubescent; perianth not hairy; styles 2-4. **Suaeda** (SEA BLITE)
- KK.** Stem more or less villous-tomentose; perianth densely white-tomentose; style 1. **E.** — (Honor of W. D. J. Koch, a German botanist.) **Kochia americana** (WHITE SAGE)
- DD.** Shrubs; leaves entire; flowers unisexual; fertile flowers without perianth.
- L.** Plant densely white-tomentose with stellate hairs, not spinescent; bracts of fruit with 4 tufts of long hairs; pericarp hairy. **E.** — (Gk. *euros* = mold; referring to the white-hairy herbage.) **Eurotia lanata** (WINTER FAT)
- LL.** Plant not hairy as above, spinescent (except *Atriplex nuttallii*); pericarp glabrous.
- M.** Leaves linear, quite fleshy, somewhat terete; perianth present in pistillate flowers but not in staminate. **E.** — (Gk. *sarkos* = flesh, *batos* = a bramble; referring to the fleshy leaves and thorny stems.) **Sarcobatus vermiculatus** (GREASEWOOD)
- MM.** Leaves wider than linear, not or only slightly fleshy, flat, not terete; perianth present in staminate flowers but not in pistillate.
- N.** Leaves 12-31 mm. long; plant spiny; bracts obcompressed, in fruit united into a sac; perianth segments of staminate flowers 4. **E.** — (Honor of Asa Gray, an American botanist.) **Grayia spinosa** (HOP SAGE)
- NN.** Either leaves only 4-17 mm. long or plant not spiny; bracts compressed, in fruit united but not to the top; perianth segments of staminate flowers 5. (See **F.**) **ATRIPLEX** (ATRIPLEX)
- AA.** Leaves almost none or mere scales, opposite; branches opposite; stems conspicuously jointed, very fleshy. **W.** — (*L. sal* = salt, *cornu* = a horn; salt plants with hornlike branches.) **Salicornia ambigua** (SALT-HORN)

AMARANTHACEAE (PIGWEEED FAMILY)

Annual herbs. Leaves alternate, simple. *Flowers* imperfect, small, green or white or purplish, *with scarious bractlets*, variously grouped. *Perianth* herbaceous or membranous, *scarious*, 2-5-

parted. Stamens 1-5. *Ovary superior*, 1-celled; stigmas 1-3. *Fruit a utricle*. Seed 1. — Only the following genus.

AMARANTHUS (PIGWEED)

Leaves pinnately veined, petioled. Flowers mostly with 3-5 bractlets, in dense terminal spikes or axillary clusters. Utricle 2-3-beaked by the persistent styles. — Mostly weeds. (Gk. *amarantos* = unfading; because the colored calyx and bracts are chaffy and do not wither.)

- A. Stems erect, 3-20 dm. high; flowers in dense terminal spikes; sepals 5; stamens 5.
- B. Spikes green, stout, 8-14 mm. thick. E. **A. retroflexus** (ROUGH PIGWEED)
- BB. Spikes purple, slender, 4-6 mm. thick. E. **A. paniculatus** (PURPLE PIGWEED)
- AA. Stems spreading or ascending (rarely erect in *A. graecizans*), 1.5-6 dm. long; flowers crowded in close small axillary clusters; sepals 1-3 (4-5 in *A. blitoides*); stamens 3 or fewer.
- C. Fertile flowers with 3 bracts and 3-5 sepals.
- D. Branches and flower heads and under side of leaves all pinkish to deep flesh-color. E. **A. carneus**
- DD. Branches and flower clusters and leaves all whitish or green.
- E. Plant prostrate; sepals 3-5, very little longer than the bracts; fruit not rugose; seed about 1.5 mm. wide. W. E. **A. blitoides** (PROSTRATE PIGWEED)
- EE. Plant ascending or erect; sepals 3, much longer than the bracts; fruit rugose; seed about 0.8 mm. wide. E. **A. graecizans** (TUMBLEWEED)
- CC. Fertile flowers with 1 bract and 1 sepal. E. **A. californicus**

NYCTAGINACEAE (4-O'CLOCK FAMILY)

Herbs; juice watery. Stems fragile; joints swollen. *Leaves opposite*, simple, entire, petioled; *stipules none*. Flowers perfect, in terminal or axillary clusters; clusters involucrate. *Perianth corolla-like*, tubular or campanulate or salverform, 4-5-lobed or toothed. Stamens few. *Ovary superior*, 1-celled; stigma capitate. *Fruit in akene*, somewhat ribbed or grooved or winged, *inclosed by the hardened perianth base*. Seed 1.

- A. Leaves narrowly ovate or wider; perianth not purple.
- B. Flowers about 5 cm. long; involucre bracts 25-38 mm. long, united to above their middle; fruit not winged nor even strongly angled. C. E. — (*L. mirabilis* = wonderful; any striking flower is wonderful when first found.) C. E. **Mirabilis greenei** (4-O'CLOCK)
- BB. Flowers 1-2.5 cm. long; involucre bracts 4-19 mm. long, distinct to base; fruit 3-5-winged. **ABRONIA** (p. 85)
- AA. Leaves linear; perianth purple. E. — (Honor of C. Allioni, an Italian botanist.) **Allionia linearis** (UMBRELLA-WORT)

ABRONIA (ABRONIA)

Perennial; stems prostrate to erect, mostly glandular-pubescent. Leaves thick, one of each pair somewhat the larger. Flowers sessile, conspicuous;

clusters solitary or again clustered, on long peduncles. Perianth 5-lobed; lobes spreading, obcordate or emarginate. Stamens 3-5, unequal, on the perianth, included. Styles filiform. Akenes 1-5-winged; wings reticulate-veined. Seed cylindric. — (Gk. *abros* = graceful, delicate. Does not seem to apply to ours very well.)

A. Plants of the seashore; flowers not white.

B. Leaves broadly ovate to reniform; involucre bracts rounded to ovate or oblong; flowers yellow; wings of the fruit thick, hollow. W.

A. *latifolia* (YELLOW ABRONIA)

BB. Leaves ovate to narrowly oblong; involucre bracts narrowly lanceolate; flowers rose colored; wings of fruit thin, not hollow. W. A. *umbellata* (PINK ABRONIA)

AA. Not plants of the seashore; flowers white.

C. Stems prostrate; involucre bracts narrowly lanceolate; wings of the fruit thin, not hollow. E. A. *mellifera*

CC. Stems erect or ascending; involucre bracts broadly ovate; wings of the fruit thick, hollow. E. A. *fragrans*

PHYTOLACCACEAE (POKEWEED FAMILY)

Herbs, perennial, tall. Leaves alternate, simple, entire; *stipules none*. Flowers *perfect*, regular, in racemes. Perianth 4-5-parted or of 4-5 distinct segments; segments all alike. Stamens 10. Ovary *superior*, 10-celled; cells 1-ovuled; stigmas 10, filiform. Fruit a *berry*, dark purple. E. — (Gk. *phyton* = a plant; L. *lacca* = lacquer; referring to the red juice in the berries.)

Phytolacca decandra (POKE-BERRY)

AIZOACEAE (CARPET-WEED FAMILY)

Herbs, annual; *stems* mostly *prostrate*, branching. Leaves *whorled*; stipules scarious. Flowers small, regular, solitary, whitish. Perianth 5-parted and segments all alike. Stamens 3-5, hypogynous. Ovary usually *superior*, 3-5-celled. Fruit a *capsule*, loculicidal. Seeds many. E. — (L. *mollis* = soft; they form a carpet-like growth.)

Mollugo verticillata (CARPET-WEED)

PORTULACACEAE (PURSLANE FAMILY)

Herbs, low, mostly *fleshy or succulent*, rarely somewhat woody. Leaves alternate or opposite. Flowers *regular*, perfect, axillary or terminal. *Sepals* usually 2, in some more. Petals none to many. Stamens as many as the petals or fewer, rarely more, opposite the petals when of the same number; filaments filiform. Ovary *superior*, 1-celled; *placenta* central, free; styles 2-9-cleft or -divided. Fruit a *capsule*, membranous or crustaceous, circumscissile or 2-3-valved. Seeds 2 to many.

- A. Sepals not scarious; styles or stigmas 3 or more.
- B. Ovary quite free from the calyx; leaves either mostly basal or mostly scattered along the stem.
- C. Caudex beset with short subulate spines which are the persistent midribs of former leaves; leaves terete, about 12 mm. long; sepals deciduous; stamens 20-30. E. — (The native name of an African species.)

Talinum spinescens (ROCK PINK)

- CC. Caudex not beset with spines or none; leaves either not terete or else more than 12 mm. long; sepals persistent; stamens fewer (except in some species of *Lewisia*).
- D. Leaves either in a basal tuft or scattered along the stem; sepals 2-3; petals 2-5; stamens 3-10; styles or stigmas 3; capsule not circumscissile, 3-valved from apex.
- E. Most of the leaves scattered along the stem, alternate, linear to lanceolate.
- F. Leaves not scarious nor clasping at base, the upper linear, the lower lanceolate and petioled; stamens 3 or more; seed minutely tuberculate.
- W. — (Honor of J. L. Calandrini, a Swiss botanist.)

Calandrinia caulescens (RED MAIDS)

- FF. Leaves somewhat scarious and clasping at base, all linear and sessile; stamens 3; seed quite smooth.

MONTIA (p. 88)

- EE. Leaves not as above in all characters.

- G. Stems and leaves from a subterranean corm or the crown of a fleshy root; most of the leaves at the surface of the ground; involucre leaves not united; either petals not twice as long as the sepals or involucre leaves oblong or narrower.

CLAYTONIA (p. 87)

- GG. Plants without corms or fleshy roots (except *M. sibirica*, which has a fleshy root crown); leaves scattered along a stem above the ground, or involucre leaves united, or petals about thrice as long as the sepals and involucre leaves oblong.

MONTIA (p. 88)

- DD. Leaves in a tuft on the top of the caudex; sepals 2-8; petals 10-16; stamens 5-50; styles or stigmas 3-8; capsule circumscissile.

LEWISIA (p. 89)

- BB. Ovary adherent to the calyx along at least its lower half; most of the leaves scattered along the stem. E. — A weed in cultivated land. (From *L. portula* = a small gate; referring to lid of capsule.)

Portulaca oleracea (PURSLANE)

- AA. Sepals scarious at least at margin; styles or stigmas 2.

- H. Stamens 3, longer than the petals and opposite the 3 larger ones; style very long, filiform; capsule globose-ovate. W. C. E. — (Honor of a Mr. Sprague, an artist who illustrated Gray's Botanies.)

Spragua multiceps (SPRAGUA)

- HH. Stamen 1, shorter than the petals and alternate with them; style very short or hardly any; capsule linear or oval. E. — (Gk. *calypterion* = a covering. Not clear why.)

Calyptridium roseum

CLAYTONIA (SPRING BEAUTY)

Perennial, glabrous. Stem leaves 2, opposite (1-3 and alternate in *C. megarrhiza*); basal leaves 1 or more. Flowers white or yellow or rose colored, racemose; racemes simple or paniculate, terminal, naked, loose. Sepals 2. Petals always 5, free, equal, conspicuous. Stamens always 5.

Style 3-cleft. Seeds not more than 6. — (Honor of J. Clayton, an American botanist.)

- A. Flowers yellow. E. *C. aurea*
- AA. Flowers white or pink, with pink or purple veins.
- B. Stems and leaves from a deep-seated corm; stem leaves opposite, 2.
 - C. Stem 7.5–15 cm. high; stem leaves sessile, narrowly lanceolate to oblong; corm globose. W. C. E. *C. lanceolata* (PIGEON-ROOT)
 - CC. Stem 2–5 cm. high; stem leaves petioled, ovate to orbicular; corm oblong or fusiform. E. *C. umbellata*
 - BB. Stems and leaves from the top of a fleshy root; stem leaves usually alternate.
 - 1–3. E. *C. megarrhiza* (PURPLE-ROOT)

MONTIA (MINER'S LETTUCE)

Annual or perennial, glabrous. Flowers pale or white, delicate, in racemes; racemes axillary or terminal, simple or compound, loose. Sepals 2–3. Petals 0–5, more or less united at base, usually unequal, 3 a little smaller than the other 2. Stamens 3–5, on the very base of the corolla, opposite the petals. Seeds 3. — (Honor of G. Monti, an Italian botanist.)

- A. Stem leaves opposite.
- B. Stem leaves 1 pair, often united into a disk.
- C. Stem leaves not united.
- D. Plants with creeping rhizomes; most of the pedicels not subtended by bracts. W. C. E. *M. asarifolia*
- DD. Plants without rhizomes; most of the pedicels subtended by bracts.
- E. Basal leaves ovate. W. C. E. *M. sibirica*
- EE. Basal leaves narrower than ovate.
- F. Stem leaves all quite separate; inflorescence 12–50 mm. long; petals 6 mm. long. E. *M. arenicola*
- FF. Stem leaves somewhat united; inflorescence 6–12 mm. long; petals 2–4 mm. long. (See G.)
- CC. Stem leaves united at least at base.
- G. Stem leaves terete to ovate-lanceolate, not united into a disk but usually somewhat united at base at one or both sides. W. E. *M. spatulata*
- GG. Stem leaves wide, united into a disk which may however be lobed.
- H. Calyx 4 mm. long; seed 2 mm. wide; pedicels in fruit rarely longer than the calyx; basal leaves from spatulate-obovate to reniform. W. C. E. *M. perfoliata*
- HH. Calyx 2 mm. long; seed 1 mm. wide; pedicels in fruit 2–6 times as long as the calyx; basal leaves various. W. C. E. *M. parviflora*
- BB. Stem leaves several pairs, not united.
- I. Plant perennial, with filiform runners; petals 6 mm. long, pale rose color; leaves 25–50 mm. long including the petiole. W. E. *M. chamissonis* (TOAD-LILY)
- II. Plant annual, without runners; petals 2 mm. long, white; leaves 1.5–13 mm. long including the petiole. W. E. *M. fontana* (BLINKS)
- AA. Stem leaves alternate.
- J. Annual, without stolons; leaves not very fleshy; petals 5 mm. long or shorter; sepals 4 mm. long or shorter, a little shorter than the petals.
- K. Leaves narrow, sessile, clasping at base; stamens 2–5; seed quite smooth.
- L. Leaves linear, 12–75 mm. long; petals 5.
 - M. Leaves 2.5–7.5 cm. long; racemes dense; sepals about 4 mm. long; petals 4–5 mm. long; seed about 2 mm. wide. W. E. *M. linearis*

- MM. Leaves 1.2-2.5 cm. long; racemes loose; sepals about 2 mm. long; petals 2-3 mm. long; seed less than 1 mm. wide. W. E. *M. dichotoma*
- LL. Leaves spatulate, 4-8 mm. long; petals 0 or 2 or 3 or 5, 2 mm. or less long; seed 1 mm. wide. W. *H. howellii*
- KK. Leaves wide, petioled, not clasping at base; stamens 5; seed closely striate. W. *M. diffusa*
- JJ. Perennial, with slender stolons; leaves very fleshy; petals 8-10 mm. long; sepals about 2 mm. long. W. C. E. *M. parvifolia* (SPRADDLER)

LEWISIA (BITTER-ROOT)

Perennial; caudex and root fleshy, perpendicular. Flowers on 1-flowered scapes or in panicles with scapose stalks, showy, white to rose color or deep red. Styles 2-8-cleft or -parted. Capsule circumscissile at the very base. Seeds many. — (Honor of M. Lewis of the Lewis and Clarke expedition.)

- A. Scapes 1-flowered, jointed about the middle; involucre bracts 5-7, near the middle of the scape; sepals 4-8; petals 10-15. E. *L. rediviva*
- AA. Scapes 1- to many-flowered, jointed at base; involucre bracts 2, near the calyx; sepals 2; petals 3-10.
- B. Flowers many, in open paniculate racemes.
- C. Leaves 12 mm. or more wide, spatulate to obovate.
- D. Leaf-margin not hyaline nor crisped; filaments united at base. W. *L. cotyledon*
- DD. Leaf margin hyaline, crisped; filaments free. W. *L. howellii*
- CC. Leaves 8 mm. or less wide, terete or linear-spatulate.
- E. Petals 10-13 mm. long; leaves not glaucous, flat, linear-spatulate. W. C. *L. columbiana*
- EE. Petals about 6 mm. long; leaves glaucous, terete or subspatulate. W. *L. leana*
- BB. Flowers 1-5, in umbels.
- F. Leaves obovate or linear-oblancheolate.
- G. Leaves obovate; seed granulate. E. *L. tweedyi*
- GG. Leaves linear-oblancheolate; seed smooth. W. *L. oppositifolia*
- FF. Leaves linear or lanceolate.
- H. Root fusiform or conical; petals 8 mm. or more long.
- I. Sepals entire; petals white, 12-16 mm. long. E. *L. nevadensis*
- II. Sepals erose; petals red, about 8 mm. long. C. E. *L. pygmaea*
- HH. Root corm-like, globular; petals about 4 mm. long. C. E. *L. triphylla*

CARYOPHYLLACEAE (CHICKWEED FAMILY)

Herbs, annual or perennial, often swollen at the base. *Leaves opposite* or apparently whorled, *entire or nearly so*. Flowers perfect or rarely dioecious, regular. Sepals 4-5, persistent. Petals as many as the sepals or none. Stamens twice as many as the sepals or fewer, hypogynous or perigynous. *Ovary 1*, mostly *1-celled*; *styles 2-5*; *placenta central*. *Fruit a capsule*, membranous, opening by valves or teeth. *Seeds several to many*.

- A. Sepals united into a cup or tube; petals always present, with slender claws; stipules none.

- B. Calyx with 10 to many veins; styles 3-5.
- C. Flowers 2.5-4 cm. in diameter; calyx-teeth 2-3 cm. long, foliaceous; petals dark purplish red; styles 5, opposite the petals; leaves linear. W. E. — A weed. (Gk. *agros* = field, *stemma* = a crown; on account of the beauty of the flowers.) **Agrostemma githago** (CORN COCKLE)
- CC. Flowers mostly not so wide; calyx-teeth much shorter, not foliaceous; petals mostly not colored as above.
- D. Leaves mostly linear; styles 3; capsule opening by 3 or 6 teeth. **SILENE** (p. 90)
- DD. Leaves wider than linear; styles 5; capsule opening by 4 or 5 or 8 or 10 teeth. **LYCHNIS** (p. 92)
- BB. Calyx with 5 veins; styles 2. **SAPONARIA** (p. 92)
- AA. Sepals distinct or nearly so; petals none or without claws.
- E. Stipules none.
- F. Capsule cylindric; petals always present. **CERASTIUM** (p. 93)
- FF. Capsule ovoid or oblong.
- G. Styles either fewer than the sepals, or else as many and opposite them.
- H. Petals none or entire or merely emarginate; leaves often sharp-pointed, either terete or angular or narrowly linear, or else petals present. **ARENARIA** (p. 94)
- HH. Petals none or deeply divided into 2 lobes; leaves never sharp-pointed, flat, broadly linear or wider. **STELLARIA** (p. 92)
- GG. Styles as many as the sepals and alternate with them; petals none or entire or emarginate. **SAGINA** (p. 93)
- EE. Stipules present, scarious.
- I. Leaves apparently in whorls; styles 5; petals always present. W. E. — A weed in grain fields. (L. *spargare* = to scatter; the seed is widely sown with grains.) **Spergula arvensis** (CORN SPURRY)
- II. Leaves opposite; styles 3, rarely 5; petals sometimes none. **TISSA** (p. 94)

SILENE (CATCH-FLY)

Annual or perennial. Flowers mostly pink or white. Calyx more or less inflated, ovoid to campanulate, 5-toothed or -cleft, 10- to many-veined, not bracted at base. Petals narrow, clawed. Stamens 10. Ovary 1-celled or incompletely 2-4-celled. Seeds many, spiny or tubercled. — (Gk. *sialon* = saliva; on account of the sticky substance on the stem of some species.)

- A. Calyx with 15 or more veins.
- B. Leaves narrowly oblong to linear; calyx veins 18-23, obscure. W. **S. multinervia**
- BB. Leaves ovate-lanceolate; calyx veins 15-20, prominent. W. E. **S. latifolia** (BLADDER CATCH-FLY)
- AA. Calyx with 5-10 veins.
- C. Plant 2.5-5 cm. high; leaves crowded so as to hide the stem, linear. W. C. E. **S. acaulis** (MOSS CATCH-FLY)
- CC. Plant taller; leaves not crowded so as to hide the stem, various in width.
- D. Flowers 25 mm. or more wide.
- E. Leaves lanceolate to ovate-elliptic, acuminate; flowers deep red. W. **S. californica**
- EE. Leaves oblanceolate, acute or obtuse; flowers white or pink. W. **S. hookeri**
- DD. Flowers 12-25 mm. wide.

- F.** Petals entire, or emarginate, or 2-lobed or -cleft, or the 2 lobes again merely emarginate.
- G.** A part of each of the upper internodes of the stem glutinous; stem otherwise glabrous or merely puberulent; plant annual or biennial.
- H.** Flowers 3-4 mm. wide, paniculate; calyx ovoid; leaves linear to lanceolate.
W. C. E. *S. antirrhina* (SLEEPY CATCH-FLY)
- HH.** Flowers 12-17 mm. wide, cymose; calyx club-shaped; leaves ovate-lanceolate. W. E. *S. armeria* (SWEET-WILLIAM CATCH-FLY)
- GG.** Stem either not sticky at all, or else viscid-pubescent and thus sticky throughout the whole of the internodes.
- I.** Leaf-blades widest below their middle.
- J.** Calyx 21-31 mm. long; plant annual or biennial, viscid-pubescent or hirsute.
W. E. *S. noctiflora* (NIGHT-BLOOMING CATCH-FLY)
- JJ.** Calyx 8-20 mm. long; plant perennial.
- K.** Leaves ovate-lanceolate; flowers in the forks of the branches thus forming a leafy inflorescence; calyx 5-8 mm. long; plants finely glandular-pubescent. W. E. *S. menziesii* (MENZIES PINK)
- KK.** Leaves narrower; flowers in cymes or spikes or panicles which are not leafy; calyx longer.
- L.** Plant viscid-tomentose; inflorescence subspicate or cymose-paniculate; petal blades scarcely exceeding the 4 appendages; ovary stipitate. W. C. E. *S. spaldingii*
- LL.** Plant pubescent but not viscid; inflorescences 3-5-flowered cymes; petal blades quite longer than the appendages; ovary not stipitate.
W. C. E. *S. douglasii*
- II.** Leaf blades widest at or above their middle.
- M.** Inflorescence a whorled spike; flowers many; stem hairs not jointed; petals 2-lobed, the lobes again emarginate. W. E. *S. scouleri*
- MM.** Inflorescence a simple 1-sided raceme, often spikelike; flowers several to many; stem hairs white, jointed; petals entire to 2-lobed, the lobes not emarginate. W. *S. anglica* (ENGLISH CATCH-FLY)
- MMM.** Inflorescence a panicle, or flowers only 1-7 and scattered; stem hairs not jointed; petals emarginate or 2-lobed, the lobes not again emarginate.
- N.** Plants 1-2.5 dm. high; leaves 0.6-2.5 cm. long.
- O.** Petal lobes entire; petal appendages retuse. C. E. *S. suksdorfii*
- OO.** Petal lobes each with a short lateral tooth; petal appendages obtuse.
W. C. *S. watsoni*
- NN.** Plants 3-9 dm. high; leaves 2.5-7.5 cm. long.
- P.** Stem with leaves; basal leaves 1-veined, 2-4 mm. wide. W. C. E. (See LL.)
- PP.** Stem with 1-2 pairs of bracts but no leaves; basal leaves 3-veined, 6-11 mm. wide. E. *S. scaposa*
- FF.** Petals with 4 or more distinct lobes or divisions.
- Q.** Flowers borne in the forks of the branches and forming a leafy inflorescence.
W. C. *S. campanulata*
- QQ.** Flowers in naked or bracted cymes or panicles.
- R.** Calyx campanulate; ovary not stipitate. W. C. E. *S. macounii*
- RR.** Calyx cylindric or obovoid ovary stipitate, but in some very shortly so.
S. Calyx 7-9 mm. long. W. *S. lemmoni*
- SS.** Calyx 12-19 mm. long.
- T.** Plant fetid, very viscid. C. E. *S. oregana*
- TT.** Plant not fetid, not glandular or only somewhat so above.
- U.** Petals 2-parted, each part again 2-lobed. W. *S. montana*
- UU.** Petals 3-parted, each part again 2-lobed. W. *S. gormani*

LYCHNIS (COCKLE)

Perennial. Calyx ovoid to clavate, 10-veined, usually inflated, 5-toothed. Petal blade entire or variously lobed or cleft. Stamens 10. Ovary 1-celled, partly 4-5-celled at base. — (Gk. *lychnos* = a lamp or light; referring to the flamelike color of some species.)

- A. Plant white-woolly; calyx teeth twisted; petals exserted, spreading above the calyx. W. E. **L. coronaria** (MULLEIN PINK)
 AA. Plant ashy-puberulent to glabrous; calyx teeth not twisted; petals not or very little spreading above the calyx.
 B. Plant dwarf, caespitose; stems 1-flowered; petals exserted. E. **L. kingii**
 BB. Plant 2-5 dm. high, erect; stems few-flowered; petals included or nearly so. W. E. **L. drummondii** (DRUMMOND PINK)

SAPONARIA (SOAPWORT)

Annual or perennial, glabrous, diffuse or erect. Leaves wide. Flowers white or pink or red. Calyx ovoid to tubular, 5-toothed. Petals entire or emarginate. Stamens 10. Ovary 1-celled. Capsule ovoid or oblong, opening by 4 valves which appear as apical teeth. — (L. *sapo* = soap; the mucilaginous juice lathers with water.)

- A. Annual, dichotomously branched; calyx sharply 5-angled, 1-15 mm. long, oblong or ovate. W. E. **S. vaccaria** (COW HERB)
 AA. Perennial, not dichotomously branched; calyx terete, 16-21 mm. long, tubular. E. **S. officinalis**

STELLARIA (CHICKWEED)

Annual, tufted, low. Flowers either solitary in the leaf axils or else in cymes. Sepals 4-5. Petals none or white. Stamens 10 or fewer, hypogynous. Ovary 1-celled; styles usually 3, usually opposite the sepals. Capsule globose to oblong; valves usually 6. Seeds several to many. — (L. *stella* = a star; referring to the star-shaped flowers.)

- A. Lower leaves petiolate.
 B. Pubescence of stem scattered; styles 5; petals always present. W. **S. aquatica** (WATER CHICKWEED)
 BB. Pubescence of stem a line of hairs; styles 3-4; petals always present. W. E. **S. media** (COMMON CHICKWEED)
 BBB. Pubescence of stem none except at base; styles 3-4; petals sometimes none. W. C. E. **S. nitens** (SHINING CHICKWEED)
 AA. Leaves all sessile or nearly so.
 C. Petals bifid to the middle or less, always present.
 D. Stem smooth except for a puberulent line. E. **S. oxyphylla**
 DD. Stem glandular-pubescent at least above. E. **S. jamesiana**
 CC. Petals bifid nearly to the base.
 E. Inflorescence bracts small, scarious.
 F. Petals equaling or exceeding the calyx, always present.
 G. Cymes few-flowered; pedicels erect. W. C. E. **S. longipes**
 GG. Cymes diffuse; pedicels spreading.
 H. Leaves lanceolate, widest near the base; seed rough under hand lens. W. E. **S. graminea**

- HH. Leaves linear, widest near the middle; seed smooth under hand lens.
W. E. *S. longifolia* (LONG-LEAVED CHICKWEED)
- FF. Petals none or much shorter than the calyx.
- I. Pedicels grouped in somewhat umbel-like clusters; capsule 6-8 mm. long. E.
S. umbellata (UMBEL CHICKWEED)
- II. Pedicels scattered, not in umbel-like clusters; capsule 3-4 mm. long. (See J.)
- EE. Inflorescence bracts foliaceous.
- J. Leaves lanceolate. W. C. E. *S. borealis* (NORTHERN CHICKWEED)
- JJ. Leaves ovate.
- K. Sepals obtuse, hardly scarious-margined; petals none. W. E. *S. obtusa*
- KK. Sepals acute, scarious-margined.
- L. Petals exceeding the calyx, always present. W. *S. humifusa*
- LL. Petals exceeded by the calyx, sometimes none.
- M. Stem glabrous; sepals lanceolate; petals minute or none. W. C. E.
S. crispa
- MM. Stem pubescent, sepals ovate; petals none. W. C. *S. washingtoniana*

CERASTIUM (MOUSE-EAR)

Annual or perennial, mostly pubescent or hirsute. Flowers white, in dichotomous terminal cymes. Sepals 5. Petals bifid to entire. Stamens 10. Styles as many as the sepals and opposite them, or fewer. Capsule 1-celled, often curved, valves twice as many as there are styles. Seeds many, rough. — (Gk. *keras* = a horn; referring to the shape of the pod.)

- A. Petals not longer than the sepals, always present.
- B. Perennial, flowering in summer and fall; pedicels longer than the calyx. W. E.
C. vulgatum (COMMON MOUSE-EAR)
- BB. Annual, flowering in spring; pedicels not longer than the calyx. W. C. E.
C. viscosum (SPRING MOUSE-EAR)
- AA. Petals decidedly longer than the sepals, rarely none.
- C. Flowers 12-21 mm. wide; perennial. W. C. E. *C. arvense* (FIELD MOUSE-EAR)
- CC. Flowers 4-6 mm. wide.
- D. Annual; calyx not scarious-margined nor hairy. E. *C. nutans* (POWDERHORN)
- DD. Perennial; calyx scarious-margined, hairy. W. C. E. *C. beerlingianum*

SAGINA (PEARLWORT)

Annual or perennial, tufted or matted, low. Leaves subulate or filiform. Flowers small, whitish, pedicelled, terminal. Sepals 4-5. Petals none, or entire to emarginate. Stamens as many as the sepals, or fewer, or twice as many. Ovary 1-celled. Capsule 4-5-valved, opening at base. Seeds many. — (L. *sagina* = fattening; first the name of *Spergula*, with fleshy leaves.)

- A. Herbage glabrous.
- B. Annual; stems decumbent, several-flowered, the lower flowers lateral; flowers 1-3 mm. wide. W. C. E. *S. occidentalis*
- BB. Perennial; stems either erect, or else with a single terminal flower; flowers 3-5 mm. wide.
- C. Stems decumbent, filiform, 1-flowered, the flower terminal; pedicels at length nodding. C. E. *S. saginoides*

CC. Stems erect, somewhat fleshy, several-flowered, the lower flowers lateral; pedicels remaining straight. W. S. crassicaulis

AA. Herbage glandular-puberulent; annual. * W. S. ciliata (HAIRY PEARLWORT)

ARENARIA (SANDWORT)

Annual or perennial, mostly low, often tufted. Leaves sessile in most species, often rigid, ovate to subulate. Flowers small, white, solitary or in cymes; cymes paniculate or headlike. Sepals 4-5. Stamens twice as many as the sepals. Styles 2-5, usually 3, opposite the sepals. Capsule valves 2-5, entire or 2-cleft. Seeds few to many.—(L. *arena* = sand; referring to the habitat of many species.) Species difficult. (F. & R. pp. 158-160).

TISSA (SAND-SPURRY)

Annual or perennial. Leaves fleshy in most, linear or setaceous, often clustered in the axils. Flowers small, whitish or pink, in terminal bracted or leafy cymes or racemes. Sepals 5. Petals none or entire. Stamens 2-10. Ovary 1-celled. Pod 3-valved at base. Seeds many.—(A Latin name of unknown meaning.)

A. Plants of saline soils; leaves very fleshy.

B. Perennial; roots large; mature capsules 4-5 mm. in diameter. W.

T. *macrotheca* (LARGE SAND-SPURRY)

BB. Annual; roots fibrous; mature capsules less than 4 mm. in diameter. W.

T. *marina* (SALT-MARSH SAND-SPURRY)

AA. Plants not of saline soils; leaves not fleshy.

C. Stipules ovate-lanceolate, 4-6 mm. long; stamens usually 5. W. E.

T. *rubra* (PINK SAND-SPURRY)

CC. Stipules deltoid, shorter; stamens mostly 2-3. E.

T. *diandra*

ILLECEBRACEAE (KNOTWORT FAMILY)

Herbs, perennial, low, densely tufted. Leaves mostly *opposite*, mostly *entire*, subulate, densely crowded; stipules scarious. Flowers sessile, in axillary clusters. Calyx persistent, 5-parted. Petals minute, scalelike. Stamens on the calyx. Ovary 1-celled; style *bifid*. Fruit a *utricle*. Seed 1.—On sand near the seashore. (Gk. *pente* = 5, *kainis* = a knife; referring to the 5 sharp-pointed sepal spines.) W.

Pentacaena ramosissima (THORNY SANDWORT)

NYMPHAEACEAE (WATER-LILY FAMILY)

Herbs, aquatic, perennial; rhizomes horizontal. Leaves large, floating or immersed, or rarely emersed. Sepals 3-12. Petals 3 to many. Stamens 5 to many. Carpels 3 to many, distinct or united; stigmas distinct or united into a *radiate or ringlike disk*; ovules 1 to many. Fruits indehiscent.

- A. Leaves peltate, on an elongated stem; flowers 1-2 cm. wide; carpels distinct; pistils 4-18, not dehiscent. W. E. **Brasenia schreberi** (WATER SHIELD)
- AA. Leaves not peltate, all basal; flowers 2.5-13.7 cm. wide; carpels united into a single dehiscent pistil.
- B. Sepals 4, flat; petals 2-3.5 cm. long, white or pinkish, epigynous. E. — (Gk. *kastalia* = a mythical fountain on Mt. Parnassus.)
Castalia tetragona (SMALL WHITE WATER-LILY)
- BB. Sepals 8-12, concave; petals 1-1.5 cm. long, yellow, hypogynous. W. C. E.
— Seeds edible. (White ones were dedicated by the Greeks to the water nymphs.)
Nymphaea polysepala (YELLOW POND-LILY)

CERATOPHYLLACEAE (HORNWORT FAMILY)

Herbs, perennial, aquatic, submerged; stems slender, branching. Leaves whorled; threadlike or stag-horn-like, terminal tuft of leaves slimy and persisting through the winter. Flowers extremely rare. W. E. — (Gk. keras = a horn, phyllon = a leaf; the leaves branch stag-horn-like.)

Ceratophyllum demersum (HORNWORT)

RANUNCULACEAE (BUTTERCUP FAMILY)

Herbs or shrubs, annual or perennial, climbing when shrubby. Leaves alternate or opposite (Clematis) or a single whorl (Anemone), simple or compound; stipules none. Flowers regular or irregular. Sepals 3-15, often petal-like, imbricated (except in Clematis). Petals of about the same number as the sepals, rarely more, rarely none. Stamens 10 to many, hypogynous. Carpels 1 to many, often separate, in fruit becoming akenes or follicles or berries.

- A. Leaves either alternate or all basal.
- B. Flowers spurless or 1-spurred; leaves various.
- C. Flowers regular; leaves various.
- D. Leaves simple.
- E. Leaves entire; fruit of 1-seeded akenes. **MYOSURUS** (p. 100)
- EE. Leaves either not entire, or else fruit of several-seeded follicles.
- F. Petals none.
- G. Leaves entire or crenate; sepals 5-15; fruit of follicles; follicles several-seeded, not 4-angled. **CALTHA** (p. 96)
- GG. Leaves palmately lobed; sepals 4; fruit of akenes; akenes 1-seeded, 4-angled. W. C. E. — (Honor of E. R. von Trautvetter, a Russian botanist.)
Trautvetteria grandis (FALSE BUGBANE)
- FF. Petals present.
- H. Plants glabrous; petals 15-25; fruit of many-seeded follicles. W. C. E.
— (German *trol* = something round; referring to the form of the flower.)
Trollius laxus (SPREADING GLOBE-FLOWER)
- HH. Plants either pubescent or petals fewer; fruit of 1-seeded akenes.

- I. Flowers white; stems submerged; leaves filiform when submerged; akenes transversely rugose; petals with a naked spot or pit at base.

BATRACHIUM (p. 100)

- II. Flowers yellow; stems mostly not submerged; rarely the leaves filiform; akenes not transversely rugose; petals with a small scale at the base of the claw.

RANUNCULUS (p. 101)

- DD. Leaves compound.

- J. Petals not red; flowers often small; fruit of follicles or akenes, or a red berry.

- K. Fruit of akenes, these each 1-seeded.

- L. Petals present; leaves rarely ternately more than 1-compound; inflorescence either not panicles nor racemes, or else flowers large; flowers perfect. (See **HH.**)

- LL. Petals none; leaves ternately 2-3-compound; inflorescence panicles or racemes; flowers small, mostly not perfect.

THALICTRUM (p. 102)

- KK. Fruit of follicles or berries, these each several-seeded.

- M. Fruit of follicles; carpels 2 or more (except sometimes in *Cimifuga elata*).

- N. Leaves withering in the fall, not all basal; follicles sessile or short-stalked, in heads.

- O. Stems 9-24 dm. high, many-flowered.

CIMIFUGA (p. 98)

- OO. Stems 0.5-3 dm. high, 1- to several-flowered.

ISOPYRUM (p. 97)

- NN. Leaves green throughout the winter, all basal; follicles long-stalked, in umbels.

COPTIS (p. 97)

- MM. Fruit a red berry; carpel 1.

ACTAEA (p. 97)

- JJ. Petals red; flowers large; fruit of many-seeded follicles. E. — (Honor of Paeon, a Greek physician.)

Paeonia brownii (PEONY)

- CC. Flowers irregular; leaves palmately-lobed or -cleft or -divided.

- P. Upper sepal spurred.

DELPHINIUM (p. 98)

- PP. Upper sepal arched into a hood.

ACONITUM (p. 99)

- BB. Flowers regular; petals 5, each with a long tubular spur; leaves ternately 1-3-compound.

AQUILEGIA (p. 98)

- AA. Stem leaves opposite or whorled.

- Q. Stem herbaceous, erect; stem leaves in a single whorl of 2-3.

- R. Style short, glabrous or pubescent, not plumose.

ANEMONE (p. 99)

- RR. Styles long, filiform, becoming plumose. W. C. E. — (Perhaps diminutive of *L. pulsare* = to beat or pulse; application not clear.)

Pulsatilla occidentalis (PASQUE FLOWER)

- QQ. Stem often woody, erect or viney; stem leaves more than 3, opposite; style plumose.

CLEMATIS (p. 100)

CALTHA (MARSH MARIGOLD)

Herbs, glabrous. Leaves mostly basal, cordate or reniform. Flowers white or yellow or pink. Sepals petal-like, large, deciduous. Stamens many. Pistils 5-15, sessile. — Marsh plants. (Gk. *kalathos* = a goblet; referring to the form of the flower.)

- A. Stem decumbent, several-leaved; flowers yellow; follicles sessile. W. — Poisonous.

C. palustris

- AA.** Stem erect, scapose or 1-leaved; flowers white or purplish; follicles more or less stalked.
- B.** Leaf blades wider than long, reniform-orbicular; sepals lanceolate, acute. W. C. E. **C. leptosepala**
- BB.** Leaf blades longer than wide, roundish to oblong-cordate; sepals oblong to spatulate, obtuse. W. C. **C. biflora**

ISOPYRUM (FALSE RUE)

Herbs, perennial, low, smooth. Leaves alternate, ternately 2-3-compound. Flowers white, solitary or clustered. Sepals 5-6, petal-like, regular, deciduous. Petals none or very small. Stamens 10-40. Follicles 2-20. Seeds 2 to several. — (Gk. *isopyron* = the name of some plant of the genus *Fumaria*.)

- A.** Stem 0.5-1 dm. high, 1-flowered; sepals oblong, 6 mm. long; follicles short-stalked. W. **I. stipitatum** (SMALL FALSE RUE)
- AA.** Stem 3-9 dm. high, several-flowered; sepals obovate, 8 mm. long; follicles sessile. W. **I. hallii** (TALL FALSE RUE)

COPTIS (GOLDTHREAD)

Herbs, perennial, low, glabrous; rootstalks creeping. Leaves ternately-compound. Flowers white, solitary or few, on naked scapes. Sepals 5-7, petal-like, deciduous, white or greenish. Petals 5-6, small, linear, cucullate. Stamens 10-25. Follicles 3-12. — (Gk. *kopto* = to cut; from the divided leaves.)

- A.** Leaflets obscurely 3-lobed; sepals oval or oblong, obtuse; petals enlarged at the summit. W. C. E. **C. trifolia**
- AA.** Leaflets rather deeply lobed or segmented; sepals linear or ligulate, attenuate; petals enlarged near the middle.
- B.** Leaves ternate.
- C.** All 3 leaflets long-petioluled; leaf-divisions obtuse, obtusely dentate; seed oblong. C. E. **C. occidentalis**
- CC.** Middle leaflet long-petioluled, lateral short-petioluled; leaf-divisions acute, acutely dentate; seed oval. W. C. **C. laciniata**
- BB.** Leaves pinnately 5-foliolate. W. **C. asplenifolia**

ACTAEA (BANEERRY)

Herbs, perennial, tall. Leaves alternate, ternately 3-compound. Flowers small, white, in short terminal racemes. Sepals 5-6, nearly equal, petal-like. Petals 4-10 or none, less showy than the stamens. Stamens many. Stigma wide, 2-lobed, covering the carpel. Seeds many. — (Gk. *aktea* = an old name for the Elder.)

- A.** Leaf teeth sharp, acuminate. W. C. E. **A. arguta**
- AA.** Leaf teeth rounded or mucronate. E. **A. rubra**

CIMIFUGA (BUGBANE)

Herbs, perennial, tall. Leaves ternately compound, large. Flowers small, white, in paniced racemes. Sepals 4-6, falling soon after the flower opens. Petals 0-8. Stamens many. Follicles 1-8. Seeds many. — (*L. cimex* = bug, *fugere* = to drive away; its odor drives insects away.)

A. Petals none; staminodia 1-2 or more; follicles 1-3, not stalked. W. *C. elata*

AA. Either petals or staminodia present, 1-5; follicles 3-5 or more, stalked. C.

C. laciniata

AQUILEGIA (COLUMBINE)

Herbs, perennial. Leaflets roundish, obtusely lobed. Flowers terminal, showy. Sepals 5, petal-like. Stamens many, outer long-exserted, inner merely thin scales. Follicles 5, sessile, pointed with the slender style. — (*L. aquila* = an eagle; referring to the talon-like spurs of the flowers.)

A. Flowers red to yellow, pendulous when open.

B. Petal blade from half to as long as the spur. W. C. E.

A. formosa

BB. Petal blade very short or none. W.

A. truncata

AA. Flowers white to bluish, erect or ascending when open.

C. Flowers almost white, slightly bluish. E. *A. coerulea* (WHITE COLUMBINE)

CC. Flowers bluish, somewhat yellowish on lobes and spurs. E.

A. oreophila (BLUE COLUMBINE)

DELPHINIUM (LARK-SPUR)

Herbs, erect, annual or perennial. Leaves alternate. Flowers showy, in racemes or panicles. Sepals 5, usually colored and petal-like. Petals 2 or 4, small; 2 upper petals produced backward and inclosed in the sepal spur. Stamens many. Style persistent. Follicles 1-5, sessile. Seeds many. — (*Gk. delphin* = a dolphin; from a slight resemblance of the flower.) Many are poisonous to cattle.

A. Flowers white or green or blue.

B. Most of the pedicels shorter than the flowers and the fruit.

C. Flowers blue or purplish.

D. Roots fasciculate, elongate, not tuber-like.

E. Leaves 5-7.5 cm. wide; stem 3-18 dm. high.

F. Leaf segments laciniately many parted, the lobes linear. C. E.

D. scopulorum

FF. Leaf segments 5-9, the segments and their divisions oblong to obovate-cuneate.

G. Mature follicles viscid-pubescent. E.

D. reticulatum

GG. Mature follicles glabrous. (See F.)

EE. Leaves 2.5-5 cm. wide; stem 3-6 dm. high. E.

D. andersoni

DD. Roots thickened, forming irregular tubers.

H. Plant pubescent throughout. E.

D. simplex

HH. Plant glabrous or nearly so. E.

D. distichum

CC. Flowers greenish. E.

D. viridescens

BB. Most of the pedicels longer than the flowers and the fruit.

I. Mature follicles 6.5-12.5 mm. long.

J. Stem 1-7-flowered, only 1-3-leaved. C. E.

D. depauperatum

JJ. Stems many-flowered, more than 3-leaved.

K. Stem glabrous or nearly so; sepals $\frac{3}{4}$ as long as the spur. W. C. E.

D. columbianum

KK. Stem puberulent or hirsute-pubescent below; sepals about as long as the spur. W.

D. hesperium

II. Mature follicles 13-25 mm. long.

L. Plant pubescent, 1.5-6 dm. high. W. C. E.

D. menziesii

LL. Plant glabrous or only the inflorescence hairy.

M. Plant 1.5-3 dm. high; leaves rarely over 2.5-5 cm. wide; leaf-segments obtuse. W. C. E.

D. bicolor

MM. Plant 6-18 dm. high; leaves often 10-15 cm. wide; leaf segments acute. W. E.

D. trolliifolium (POISON LARK-SPUR)

AA. Flowers scarlet or orange.

N. Flowers pale yellow. E.

D. xantholeucum

NN. Flowers red. W. C.

D. nudicaule

ACONITUM (WOLFBANE)

Herbs, perennial, tall. Leaves alternate, palmately lobed. Flowers showy, in open racemes. Sepals 5, colored, petal-like. Petals 2-5; 2 upper with long claw and spurlike blade concealed in the hood of the sepals; 3 lower small or obsolete. Follicles 3-5, sessile. Seeds many. — (Said to be from the town Acone in Asia Minor, where first found.) Said to be poisonous.

A. Stem stout, not viney; upper leaves without bulblets in their axils. C. E.

A. columbianum

AA. Stem weak, viney; upper leaves with bulblets in their axils. E. A. bulbosum

ANEMONE (ANEMONE)

Herbs, perennial, erect. Leaves lobed or divided or compound, all basal except those of the involucre. Sepals 4-20, colored and petal-like. Petals none. Stigma lateral. Akenes many, flat, pointed. — (Gk. *anemos* = the wind; from the exposed habitats.)

A. Akenes naked or merely pubescent.

B. Involucre leaves petioled.

C. Involucre leaves 3-5-foliate; stems from a horizontal rhizome.

D. Flowers 20-35 mm. wide, white. W. C. E. A. *quinquefolia* (WOOD ANEMONE)

DD. Flowers 8-12 mm. wide.

E. Sepals white or pale blue. W.

A. lyallii

EE. Sepals bright blue. C. E.

A. oregana

CC. Involucre leaves 2-3 times dissected; stems from an erect caudex. E.

A. tetonensis

BB. Involucre leaves sessile.

F. Basal leaves 3-foliate; leaflets ovate or rhombic-ovate; akenes wingless. W. C.

A. deltoidea (3-LEAVED ANEMONE)

FF. Basal leaves 3-parted or -divided; leaf lobes narrowly lanceolate or linear; akenes wing margined. E.

A. narcissiflora

AA. Akenes densely long-woolly.

G. Plants glabrate; sepals not yellowish, blue. W. C. E.

A. drummondii

GG. Plants villous-pubescent; sepals yellowish, sometimes tinged with blue. W. E.

A. multifida (CUT-LEAVED ANEMONE)

CLEMATIS (CLEMATIS)

Perennial, more or less woody, either climbing vines or else erect or ascending herbs. Leaves simple or compound; petioles slender, serving as tendrils. Sepals 4-5, petal-like. Petals none or shorter than the sepals. Stamens many. Akenes many; styles long, persistent. — (Gk. *klema* = a tendril; the petioles coil tendril-like.)

A. Herbs, erect.

B. Petiolules all straight; leaf segments linear to lanceolate. E.

C. douglasii (SUGAR BOWLS)

BB. Petiolules of some of the leaflets contorted as if for climbing; leaf segments oblong to ovate-lanceolate. E.

C. scottii (SCOTT'S CLEMATIS)

AA. Shrubby, climbing vines.

C. Flowers white, cymose-paniculate; sepals 8-13 mm. long; leaves pinnately 5-7-foliolate.

D. Akenes silky-pubescent with straight hairs. E. *C. ligusticifolia* (VIRGIN BOWER)

DD. Akenes woolly-pubescent with crinkly hairs. E. *C. suksdorfii*

CC. Flowers blue, solitary; sepals 25-50 mm. long; leaves 1-2-ternate.

E. Leaves ternate, entire or merely toothed. E. *C. occidentalis*

EE. Leaves biternate, incisely toothed or lobed. C. E. *C. alpina*

MYOSURUS (MOUSETAIL)

Herbs, annual, small. Leaves linear or linear-spatulate, basal. Flowers solitary, on simple scapes. Sepals 5-6, spurred at base. Petals 0 or 5-6, with long claws, with a pit at tip, greenish yellow. Stamens 5-25. Akenes many, apiculate or aristate, on a slender or conical receptacle. — (Gk. *mys* = a mouse, *oura* = a tail; referring to the long tail-like head of akenes.)

A. Carpels prominently beaked; carpel spike 2-25 mm. long.

B. Carpel spike sessile; petals always present; E.

M. sessilis

BB. Carpel spike on a scape 2.5-5 cm. long; petals sometimes none. E.

M. apetalus

AA. Carpels obscurely beaked.

C. Carpel spike 1-5 cm. long, 6 mm. or less thick; seed oblong. (See BB.)

CC. Carpel spike shorter, thicker; seed oval.

D. Not a salt-marsh plant. W. E.

M. minimus

DD. Salt-marsh plant, mainly maritime. W.

M. major

BATRACHIUM (WATER CROWFOOT)

Herbs, annual or perennial, aquatic or subaquatic. Submerged leaves filiform-dissected; emerged leaves when present with flat blade; petioles with dilated stipule-like base. Peduncles solitary, opposite the leaves. Akenes not margined. — (Gk. *batrachos* = a frog; on account of the aquatic habitat.)

A. Leaves mostly submerged; styles not longer than the ovary. W. C. E.

B. aquatile (DITCH CROWFOOT)

AA. Leaves nearly all floating; styles about 3 times as long as the ovary. W.

B. lobbil

RANUNCULUS (BUTTERCUP)

Herbs, annual or perennial, mostly in wet places, sometimes aquatic. Leaves simple or compound. Sepals 5, deciduous. Petals as many as the sepals or more, conspicuous or minute, with a scale at the base of the blade. Stamens several to many. Akenes many; style minute or elongated. — (Diminutive of *L. rana* = a frog; on account of the common wet habitat.)

- A. Plants aquatic or subaquatic; leaves divided into filiform segments when submerged.
- B. Petals much exceeding the sepals; carpels margined toward the base with conspicuous tumid border. E. *R. delphinifolius* (SWAMP BUTTERCUP)
- BB. Petals not much exceeding the sepals; carpels without distinct border. W. C. E. *R. purshii* (PURSH BUTTERCUP)
- AA. Plants terrestrial but often of very wet places; leaves never dissected into filiform segments (except *R. sceleratus*).
- C. Leaves entire to crenate or dentate, not lobed nor more deeply separated into segments.
- D. Leaves ovate to cordate, coarsely crenulate to dentate.
- E. Leaves acute, dentate; mature akenes not veined on the faces. E. *R. gormanii*
- EE. Leaves rounded at apex, crenate; mature akenes striate-veined on the faces. W. E. *R. cymbalaria* (SEASIDE BUTTERCUP)
- DD. Leaves either narrower or else merely crenulate or denticulate.
- F. Stem creeping, rooting from the joints. W. C. E. *R. flammula* (SPEARWORT)
- FF. Stem erect, not rooting from the joints. C. E. *R. alismaefolius*
- CC. Leaves or some of them lobed or yet more deeply separated into segments.
- G. Faces of the akenes smooth or merely pilose; mostly perennials.
- H. Plants glabrous or nearly so, 3 dm. or less high or long (except *R. sceleratus* and *R. bongardii*).
- I. Basal leaves toothed or entire or 2-7-lobed for less than $\frac{1}{2}$ the distance to the base; stem leaves 2-5-cleft or -parted.
- J. Basal leaves 2-4-toothed or -lobed; carpels forming a globose head.
- K. Blades of basal leaves widest above their middle; petals broadly obovate. E. *R. glaberrimus*
- KK. Blades of basal leaves widest below their middle; petals spatulate-oblong. E. *R. jovis*
- JJ. Basal leaves 5-9-lobed at apex, carpels forming an oblong or cylindric head. E. *R. eximius*
- II. Both basal and stem leaves parted or divided or compound.
- L. Leaves ternately divided; the segments linear to linear-spatulate, 1-2 mm. wide. E. *R. triternatus*
- LL. Leaves not so in every particular.
- M. Head of akenes globose.
- N. Beak of the akene hooked.
- O. Segments of basal leaves again deeply lobed. (See D.)
- OO. Segments of basal leaves not again lobed. E. *R. jovis*
- NN. Beak of the akene without hook.
- P. Petals 2-4 mm. long. W. E. — Very poisonous to cattle. *R. sceleratus* (CURSED BUTTERCUP)
- PP. Petals 8-13 mm. long. W. C. *R. suksdorfii*
- MM. Head of akenes 2 or more times as long as wide.

- Q. Beak of akene not hooked.
 R. Petals 2-4 mm. long; annual. (See P.)
 RR. Petals 6-13 mm. long; perennial. W. C. E. *R. eschscholtzii*
 QQ. Beak of akene hooked; petals 2-4 mm. long. C. E. *R. verecundus*
 HH. Plants pubescent or hairy, usually 3-5 dm. or more high or long (except *R. parviflorus* and *R. cardiophyllus*).
 S. Beak of akene not hooked.
 T. Petals 5, 2-4 mm. long, not exceeding the calyx; plant erect. W. E. *R. pennsylvanicus* (BRISTLY BUTTERCUP)
 TT. Petals 6 or more mm. long, exceeding the calyx.
 U. Petals 5; beak of akene less than 2 mm. long.
 V. Leaves not white-spotted; stem erect or ascending; plant without stolons. W. E. *R. oreganus*
 VV. Leaves mostly white-spotted; stem prostrate; plant with stolons. W. *R. repens* (CREEPING BUTTERCUP)
 UU. Petals 7-16; beak of akene 3-4 mm. long.
 W. Leaf segments linear to cuneate-obovate, 2-3-lobed or -toothed. W. E. *R. orthorhynchus*
 WW. Leaf segments oblong to ovate, 3-cleft or -parted and again 3-9-toothed. E. *R. platyphyllus*
 SS. Beak of akene hooked.
 X. Petals 5.
 Y. Petals 4-6 mm. long, less than $1\frac{1}{2}$ times as long as the sepals. W. C. E. *R. bongardii* (BLOTCHED BUTTERCUP)
 YY. Petals 6-15 mm. long, at least twice as long as the sepals.
 Z. Basal leaves coarsely crenate to 3-7 cleft, segments entire; stem leaves palmately many-cleft, segments incisely crenate. E. *R. cardiophyllus*
 ZZ. Basal leaves 3-parted, segments sometimes again 2-5-lobed; stem leaves 3-parted, segments entire or 2-3-lobed. E. *R. ciliatus*
 ZZZ. Basal leaves 3-5-cleft or -parted, segments 2-3-lobed; stem leaves 3-5-parted or -divided; segments entire. W. *R. occidentalis* (PRAIRIE BUTTERCUP)
 XX. Petals 6-15. W. *R. californicus*
 GG. Faces of akenes scabrous or muriculate or echinate; annuals.
 a. Akenes hispid with hooked hairs; beak of akene hooked; plant pubescent. E. *R. hebecarpus* (BUR-SEED BUTTERCUP)
 aa. Akenes muriculate.
 b. Plant villous or hirsute; leaves 3-5-parted or -divided; petals not longer than the sepals; beak of akene hooked. W. *R. parviflorus* (SMALL-FLOWERED BUTTERCUP)
 bb. Plant nearly glabrous; leaves 3-5-cleft; petals longer than the sepals; beak of akene not hooked. W. *R. muricatus* (ROUGH-SEEDED BUTTERCUP)

THALICTRUM (MEADOW-RUE)

Herbs, perennial, erect, tall, usually smooth. Leaves alternate. Flowers perfect or polygamous or dioecious, greenish white. Sepals 4-5. Stamens many, exserted. Akenes usually few, ribbed or veined. — (Said to be from Gk. *thallo* = to become green; referring to the young shoots.)

- A. Akene flat, two edged.
 B. Flowers perfect; akenes half rhombic-ovate. C. E. *T. sparsiflorum*
 BB. Flowers dioecious.
 C. Akenes lanceolate, acuminate. W. C. E. *T. occidentale*

CC. Akenes ovate or oblong or orbicular, blunter.

D. Akenes few to many, 4-6 mm. long, ovate; seed head usually not globular
W. E. T. fendleri

DD. Akenes many, about 6 mm. long, obovate; seed head dense, globular. W.
T. polycarpum

AA. Akenes terete or but slightly flat, ovate to short-oblong.

E. Leaves glabrous and glaucous; flowers dioecious. E. T. venulosum

EE. Leaves obscurely glandular or waxy; flowers polygamous. E.
T. purpurascens

BERBERIDACEAE (BARBERRY FAMILY)

Herbs or shrubs, perennial. Leaves simple or compound, alternate, often all basal. Flowers perfect, solitary or in racemes. *Sepals and petals* generally imbricated in several sets. *Stamens* opposite the *petals* and as many as them; *anthers* extrorse, opening by *valves*. Pistil 1; style short, ovary superior. Fruit a berry or capsule. Seeds 2 to many.

A. Herbs; leaves deciduous; ternately 1-3-compound, not spiny.

B. Leaf only 1; leaflets 3; flowers in a spike; sepals and petals none. W. C. —
(Gk. *achlys* = mist; suggested by the flowers.)

Achlys triphylla (SWEET-AFTER-DEATH)

BB. Leaves more than 1; leaflets more than 3 to a leaf; flowers in a panicle;
sepals and petals present. VANCOUVERIA (p. 103)

AA. Shrubs; leaves evergreen, pinnately 1-compound, spiny-toothed at margin.
BERBERIS (p. 103)

VANCOUVERIA (BARREN-WORT)

Flowers white or yellow; panicle bracted. Sepals 6, obovate. Petals 6, shorter than the sepals and opposite them, linear-spatulate. Fruit a capsule. Seeds many. — (Honor of G. Vancouver, a Pacific explorer.)

A. Leaves thin, membranous, not white margined. W. C. V. hexandra

AA. Leaves thick, somewhat coriaceous, narrowly white margined. U.
V. chrysantha

BERBERIS (BARBERRY)

Flowers yellow, in bracted racemes. Sepals 6-9, petal-like. Petals 6. Stamens 6; anthers opening by valves at the top. Pistil 1; stigma pel-tate. Fruit a berry. Seeds 1 to few. — The roots are medicinal. (From Arabic *berberys* = the name for the fruit of these plants.)

A. Leaves with the 3 chief veins from the base. W. C. E.

B. *nervosa* (DULL OREGON-GRAPE)

AA. Leaves with but 1 vein from the base.

B. Leaflets 3-7, pale green, dull; leaf teeth with weak spines. U. C. E.

B. *repens* (SMALL OREGON-GRAPE)

BB. Leaflets 5-11, bright green, shining; leaf teeth with strong spines. W. C. E.

B. *aquifolium* (SHINING OREGON-GRAPE)

LAURACEAE (LAUREL FAMILY)

Shrubs or trees, *aromatic*. Leaves alternate, evergreen, shining, petioled, lanceolate-oblong; stipules none. Flowers small; yellowish green, in umbels or panicles. Perianth in 2 whorls, 6-parted. *Stamens* 9, *on the perianth*, distinct, often some modified. *Ovary superior*. Fruit a drupe. Seed 1. U. — (*L. umbella* = an umbel; referring to the flower arrangement.)

Umbellularia californica (CALIFORNIA LAUREL)

PAPAVERACEAE (POPPY FAMILY)

Herbs; *juice milky or colored* at least in the root. Leaves alternate or opposite or whorled; *stipules none*. Peduncles 1-flowered. *Flowers regular*. *Sepals* 2-3. Petals 4-12 in 2 sets, imbricated in the bud. *Stamens indefinite in number*. Ovary superior. *Fruit a capsule*, 1-celled; placentae parietal. Seeds many.

A. Most of the leaves opposite or whorled, entire.

B. Stamens 4 to many; filaments narrow; carpels 3-4; flowers white or yellow.

PLATYSTIGMA (p. 104)

BB. Stamens 6; filaments very wide; carpels 6-18; flowers yellow. U. — (Gk. *platys* = flat, *stemon* = a stamen; the stamens have flat filaments.)

Platystemon californica (LONG-LEAVED CREAM-CUPS)

AA. Leaves alternate.

C. Leaves lobed or dissected.

D. Flowers bright yellow; ovary and capsule with 2 placentae; stigma composed of 4-6 lobes.

ESCHSCHOLTZIA (p. 105)

DD. Flowers red; ovary and capsule with many placentae; stigma a radiate disk.

PAPAVER (p. 105)

CC. Leaves entire; flowers yellow; ovary and capsule with 3 placentae; stigmas 3.

E. — (Honor of W. M. Canby, an American botanist.) *Canbya aurea* (CANBYA)

PLATYSTIGMA (CREAM-CUPS)

Annual, low, slender. Flowers on long peduncles. Sepals 2-3, distinct. Petals 4-6, deciduous. Carpels united into a 3-angled to nearly terete ovary. Seed smooth, shining. — (Gk. *platys* = flat; + stigma; some species have wide flat stigmas.)

A. Plant glabrous; stem leafy; petals white, 2-4 mm. long; stamens 4-6. W. C.

P. oreganum (WHITE CREAM-CUPS)

AA. Plant somewhat villous; stem somewhat scapellike; petals yellow, 8-12 mm. long; stamens many. U.

P. lineare (YELLOW CREAM-CUPS)

ESCHSCHOLTZIA (CALIFORNIA POPPY)

Herbs, glabrous; juice bitter, of the stem colorless, of the root red or yellow. Leaves finely dissected. Sepals 2, united into a conical cap, detached and pushed off by the growth of the petals. Petals 4. Stamens many. Capsule elongated, strongly 10-veined, opening usually from the bottom up by 2 valves. Seeds many. — (Honor of J. F. Eschscholtz, a German botanist.)

A. Leaves ternately 1-3-compound; flowers 2.5-10 cm. wide.

B. Flowers 5-10 cm. wide; escaped from gardens. W. E.

E. californica

BB. Flowers 2.5-5 cm. wide; native. W. E.

E. douglasii

AA. Leaves pinnate, 5-foliolate; flowers 1-2.5 cm. wide. U.

E. hypaeoides

PAPAVER (POPPY)

Herbs, hispid or glaucous; sap milky, narcotic. Leaves alternate, lobed or dissected. Flowers nodding when in bud, showy. Sepals 2-3. Petals 4-6. Stamens many. Capsule globose to oblong, opening near the tip. Seeds many. — (Said to be from Celtic *papa* = pap; because poppy juice was formerly put into the food of children to make them sleep.)

A. Leaves pinnately parted; herbage hairy, not glaucous.

B. Capsule club-shaped, stiff-hairy; native. E.

P. argemone (CLUB POPPY)

BB. Capsule subglobose or top-shaped, glabrous; escaped from gardens. W.

P. rhoeas (FIELD POPPY)

AA. Leaves merely lobed; herbage glabrate, glaucous; escaped from gardens. W.

— This is the source of opium.

P. somniferum (GARDEN POPPY)

FUMARIACEAE (BLEEDING-HEART FAMILY)

Herbs, tender; *juice watery*. Leaves compound, dissected, alternate. *Flowers perfect, irregular. Sepals 2, small, hyaline. Petals 4, 1-2 of them spurred, somewhat united. Stamens 6, diadelphous*, opposite the outer petals. Ovary superior. Capsule 1-celled; placentae 2, parietal.

A. 2 outer (larger) petals alike, both spurred at base.

DICENTRA (p. 105)

AA. 2 outer (larger) petals unlike, only 1 spurred at base.

CORYDALIS (p. 106)

DICENTRA (BLEEDING-HEART)

Perennial, acaulescent. Flowers in scapose racemes. Corolla cordate at base; petals in 2 pairs; outer pair spurred or saccate at base; inner pair clawed, united above. Style slender. Capsule oblong or linear, 2-valved. — (Gk. *dis* = twice, *kentron* = a spur; from the 2-spurred corolla.)

A. Flowers in a raceme or panicle, white or pinkish.

B. Corolla 2-spurred at base, white or pinkish.

- E. Leaves awl-shaped; plants aquatic. **GROUP 2, P** (p. 108)
 EE. Leaves not awl-shaped; plants mostly terrestrial.
 F. Pod 3 or more times as long as wide including its stipe and beak. **GROUP 1** (p. 107)
 FF. Pod less than 3 times as long as wide including its stipe and beak. **GROUP 2** (p. 108)

GROUP 1 (with long pods)

- A. Petals yellow.
 B. Pod borne on a stipe 1 cm. or more long. **STANLEYA** (p. 110)
 BB. Pod without a stipe, or with a very short one.
 C. Leaves entire or merely serrate.
 D. Seeds in 2 rows in each cell of the pod; mature pod 3-14 mm. long. **DRABA** (p. 115)
 DD. Seeds in 1 row in each cell of the pod; mature pod 1.5-10 cm. long (or as short as 1 cm. in *Erysimum cheiranthoides*).
 E. Pod torulose; valves veinless or faintly 1-veined; petals 4-6 mm. long.
 E. — (*Crambe* is another genus; Gk. *schoenos* = a reed; hence a reed-like *Crambe*.) **Schoenocrambe linifolia** (PLAINS MUSTARD)
 EE. Pod not torulose; valves strongly keeled by the prominent mid vein; petals 6-25 mm. long (except *E. cheiranthoides*). **ERYSIMUM** (p. 115)
 CC. At least some of the leaves lobed or pinnatifid or pinnately compound.
 F. Most of the leaves of the upper $\frac{1}{2}$ of the stem entire or merely serrate.
 G. Pod not beaked, 5-12.5 cm. long when mature. (See EE.)
 GG. Pod beaked, 2 cm. or less long when mature. **BRASSICA** (p. 112)
 FF. Most of the leaves of the upper $\frac{1}{2}$ of the stem lobed or pinnatifid or pinnately compound.
 H. Pod indehiscent; seeds 2-10. **RAPHANUS** (p. 112)
 HH. Pod dehiscent; seeds usually more numerous.
 I. Pod beakless or the beak very short and thick.
 J. Seeds flat; leaves lyrate-pinnatifid. **BARBAREA** (p. 112)
 JJ. Seeds not flat; leaves not or hardly lyrate-pinnatifid.
 K. Seeds in 1 row in each cell of the pod; valves of the pod mostly 3-veined; pubescence simple or none. **SISYMBRIUM** (p. 111)
 KK. Seeds in 2 rows in each cell of the pod; valves of the pod 1-veined; pubescence often forked or stellate. **RORIPA** (p. 113)
 II. Pod with an abruptly slender or a flat beak at least $\frac{1}{8}$ as long as the fertile portion. **BRASSICA** (p. 112)
 AA. Petals either none or of some color other than yellow.
 L. Leaves ternately- or palmately-lobed or -laciniate or -divided. **DENTARIA** (p. 114)
 LL. Leaves pinnately-toothed to -compound, or entire and pinnately-veined.
 M. Pod borne on a stipe 1 cm. or more long. **STANLEYA** (p. 110)
 MM. Pod without a stipe or with a very short one.
 N. Some of the leaves pinnatifid.
 O. Stem leaves all pinnatifid.
 P. Pod indehiscent, not longitudinally 2-celled. **RAPHANUS** (p. 112)
 PP. Pod dehiscent, longitudinally 2-celled.
 Q. Pod terete, 1-16 mm. long; plants of ditches. **RORIPA** (p. 113)

- QQ. Pod flattened parallel to the partition, 12-31 mm. long; mostly not ditch plants. **CARDAMINE** (p. 113)
- QQQ. Pod flattened at right angles to the partition, 6-10 mm. long; plants of rather dry places. **SMELOWSKIA** (p. 115)
- OO. At least the leaves of the upper half of the stem entire or merely toothed or serrate.
- R. Pod 3 cm. or less long. **ARABIS** (p. 115)
- RR. Pod 3.5 cm. or more long.
- S. Petals undulate-crisped, but little longer than the sepals, the blade merely a wide extension of the claw. **CAULANTHUS** (p. 110)
- SS. Petals plane, much longer than the sepals or else the blade well developed. **THELYPODIUM** (p. 110)
- NN. All of the leaves from entire to shallowly lobed, none pinnatifid.
- T. Mature pod 2.5 cm. or less long.
- U. Pod flattened parallel to the partition.
- V. Leaves all petioled; valves veinless. **CARDAMINE** (p. 113)
- VV. Stem leaves sessile.
- W. Valves of the pod veinless; stem leaves not clasping. **DRABA** (p. 115)
- WW. Valves 1-veined; stem leaves clasping in most species. **ARABIS** (p. 115)
- UU. Pod terete or angular or hardly flattened.
- X. Plant glabrous.
- Y. Pod 2-celled by a transverse constriction, indehiscent. W.— (Arabic name.) **Cakile edentula** (SEA ROCKET)
- YY. Pod 2-celled by a longitudinal wall, dehiscent. **THELYPODIUM** (p. 110)
- XX. Plant more or less pubescent with branched hairs.
- Z. Flowers in a globular head. C.— (Honor of F. G. DeBray, a French count.) **Braya humilis** (LOW ROCK CRESS)
- ZZ. Flowers in an elongated raceme. W.— (Gk. *stenos* = narrow, *phragma* = a partition; referring to the partition in the pod.) **Stenophragma thaliana** (MOUSE-EAR CRESS)
- TT. Mature pod more than 2.5 cm. long.
- a. Caudex stout and branching, the branches densely clothed with the persistent petioles of former seasons. E.— (Honor of W. E. Parry, an English explorer.) **Parrya menziesii**
- aa. Caudex none or not so clothed.
- b. Petals flat; anthers short, subcordate. **ARABIS** (p. 115)
- bb. Petals twisted; anthers long, sagittate. **STREPTANTHUS** (p. 111)

GROUP 2 (with short pods)

- A. Flowers yellow.
- B. Pod flattened parallel to the partition.
- C. Pod orbicular; seeds 2 in each cell of the pod. W. E.— (Gk. *a* = against, *lyssa* = madness; one was reputed a remedy for hydrophobia.) **Alyssum alyssoides** (YELLOW ALYSSUM)
- CC. Pod elliptic to oblong; seeds 3 or more in each cell. **DRABA** (p. 115)
- BB. Pod flattened at right angles to the partition.

- D.** Leaves spatulate; cells of the pod much inflated and appearing like twin pods. **PHYSARIA** (p. 114)
- DD.** Leaves sagittate-clasping; cells of the pod not inflated; pod obovoid. **CAMELINA** (p. 114)
- BBB.** Pods terete.
- E.** Pod indehiscent, globose, 1-celled, 1-2-seeded. **E.** — (Honor of J. A. N. DeNesle, a French botanist.) **Neslia paniculata**
- EE.** Pod dehiscent, oval to cylindric, 2-celled, several to many-seeded.
- F.** Pod oval or obovate; leaves entire to wavy. **LESQUERELLA** (p. 114)
- FF.** Pod oblong; in nearly all species some of the leaves pinnatifid. **RORIPA** (p. 113)
- AA.** Flowers not yellow, petals often none.
- G.** Pod indehiscent, orbicular, flattened, 1-celled, 1-seeded.
- H.** Pubescence branched; pod not wing-margined. **W. E.** — (Gk. *a* = without, *thysanos* = a fringe; because the pod is not wing-margined.) **Athysanus pusillus**
- HH.** Pubescence simple; pod wing-margined. **THYSANOCARPUS** (p. 115)
- GG.** Pod dehiscent, various in form, often flattened, 2-celled, more than 1-seeded.
- I.** Pod terete. **W.** — (L. *cochlear* = a spoon; the leaves are somewhat spoon-shaped.) **Cochlearia anglica** (SPOON CRESS)
- II.** Pod flattened parallel to the partition.
- J.** Seeds 4 or more in each cell of the pod.
- K.** Flowers solitary, on scapose stems; seed broadly winged. **E.** — (Gk. *platys* = wide, *sperma* = a seed.) **Platyspermum scapigerum**
- KK.** Flowers in racemes, often on scapose stems; seed wingless. **DRABA** (p. 115)
- JJ.** Seed 1 in each cell of the pod. **W.** — (L. *lobulus* = a little lobe; probably referring to the 2-lobed hairs. **Lobularia maritima** (SWEET ALYSSUM)
- III.** Pod flattened at right angles to the partition.
- L.** Pod lanceolate or oblong-lanceolate. **SMELOWSKIA** (p. 115)
- LL.** Pod shorter for its width.
- M.** Valves of the pod obtusely keeled or rounded on the back.
- N.** Pod warty-wrinkled or -tubercled, 2-seeded. **CORONOPUS** (p. 111)
- NN.** Pod not as above, many-seeded.
- O.** Pod obovate or triangular-obovate, much flattened, notched at apex. **W. E.** — (Diminutive of L. *capsa* = a box; referring to the pod.) **Capsella bursa-pastoris** (SHEPHERD'S PURSE)
- OO.** Pod ovate or elliptic, not much flattened, not notched at apex.
- P.** Leaves entire, awl-shaped; aquatic; seeds few. **W. E.** — (L. *subula* = an awl; from the leaves.) **Subularia aquatica** (WATER AWLWORT)
- PP.** Leaves pinnatifid, not awl-shaped; terrestrial; seeds many. **W. E.** — (Honor of a Miss Hutchins, an Irish botanist.) **Hutchinsia procumbens**
- MM.** Valves of the pod acute- or wing-keeled.
- Q.** Pod orbicular or obovate; cells 1-2-seeded; petals often none. **LEPIDIUM** (p. 111)
- QQ.** Pod ovate or oblong; cells 2- to several-seeded; petals always present. **THLASPI** (p. 111)

STANLEYA

Biennial or perennial, stout. Leaves entire or few-toothed. Flowers white or greenish or yellow, in elongated many-flowered racemes. Sepals long, spreading. Petals long, narrow, slender-clawed. Stigma sessile, entire. Pod terete or subterete, elongated. Seeds oblong, in 1 row in each cell. — (Honor of E. Stanley, ex-president of the Linnaean Society.)

A. Flowers white or greenish.

B. Stem angular; buds scattered before opening; pedicels in fruit 6–8 mm. long. E. *S. viridiflora*

BB. Stem terete; buds densely massed before opening; pedicels in fruit 12–15 mm. long. E. *S. confertiflora*

AA. Flowers yellow. E. *S. rara*

THELYPODIUM (PURPLE MUSTARD)

Annual or biennial, mostly coarse. Leaves entire or pinnatifid. Flowers white or purple, in long racemes. Petals plane. Stamens well exerted. Pod linear, terete or 4-angled, with short thick stipe. Seeds in 1 row. — (Gk. *thelys* = female, *pous* = foot or stalk; the pod is short-stalked.)

A. Stem leaves cordate-clasping or auriculate at base, sessile.

B. Pods 1.2–3.1 cm. long; petals 4–12 mm. long.

C. Flowers in young clusters opening considerably below the bud-bearing apex of the flowering axis.

D. Plant hispid near the base; buds and flowers ascending. E. *T. howellii*

DD. Plant glabrous throughout; buds and flowers widely spreading. E. *T. eucosmum*

CC. Flowers opening close to the summit of the cluster while it is still corymbose.

E. Basal leaves spatulate; auricles of stem leaves obtuse. E. *T. torulosum*

EE. Basal leaves lanceolate; auricles of stem leaves acute. *T. flexuosum*

BB. Pods 5–7.5 cm. long; petals 14–17 mm. long. E. *T. sagittatum*

AA. Stem leaves not cordate-clasping nor auriculate at base, either sessile by a narrow base or distinctly petioled.

F. Annual; racemes loose; pods reflexed. W. E. *T. lasiophyllum*

FF. Biennial; racemes dense; pods spreading.

G. Leaf margin entire or wavy; pods about 2.5 cm. long. E. *T. integrifolium*

GG. At least some of the leaves with margin serrate or more deeply lobed.

H. Leaves coarsely dentate to entire; pedicels and rachis milky-white. E. *T. milleflorum*

HH. Leaves lacinate to dentate; pedicels and rachis green. C. E. *T. laciniatum*

CAULANTHUS (WILD CABBAGE)

Biennial or perennial, stout. Leaves mostly pinnatifid. Flowers dull-colored, in long racemes. Sepals large. Pod sessile, terete, with short thick stipe. Seeds in 1 row in each cell, oblong, flat. — (Gk. *kaulos* = a stem, *anthos* = a flower; referring to the long claws of the petals.)

A. Stem somewhat hairy; flowers ascending. E. *C. pilosus*

AA. Stem glabrous.

B. Flowers erect or ascending; sepals 10–12 mm. long. E. *C. crassicaulis*

BB. Flowers horizontal or reflexed; sepals less than 10 mm. long. E. *C. hastatus*

STREPTANTHUS (TWIST FLOWER)

Branching. Flowers white or purple. Sepals usually colored. Stigma entire. Pod sessile, compressed or subterete; valves 1-veined. Seed flat, margined or winged. — (Gk. *streptos* = twisted, *anthos* = a flower; referring to the twisted petals.) Not common.

LEPIDIUM (PEPPERGRASS)

Leaves small, dentate to pinnatifid. Flowers white, small, in terminal racemes. Petals rounded at apex, sometimes none. Stamens 2-6, free. Style 0-1. Pod emarginate to deeply notched at the apex. Seed not winged. — (Gk. *lepídion* = a little scale; from the form of the fruit.) Species too difficult for beginners.

CORONOPUS (WART CRESS)

Annual or biennial, diffuse. Leaves mostly pinnatifid. Flowers small, whitish. Stamens 2-6. Stigma sessile. Pod small, sessile; valves oblong or subglobose, obtuse at each end. — (Gk. *korone* = a crow, *pous* = foot; referring to the deeply cleft leaves.)

A. Pod notched at apex, rough-wrinkled. W.

C. didymus

AA. Pod not notched at apex, tubercled. W.

C. procumbens

THLASPI (PENNYCRESS)

Low, erect, glabrous. Leaves entire or dentate; at least the upper stem leaves auriculate and clasping. Flowers white or purplish. Petals obovate or oblanceolate. Stamens free. Style 0-1. Seed wingless. — (Gk. *thlaein* = to crush; on account of the flat pod.)

A. Pod 8-12 mm. wide, broadly wing-margined, notched $\frac{1}{2}$ its length; annual. W. E.

T. arvense (FIELD PENNYCRESS)

AA. Pod 2-5 mm. wide, hardly wing-margined or notched; perennial. C. E.

T. alpestre (PERENNIAL PENNYCRESS)

SISYMBRIUM (TANSY MUSTARD)

Annual or biennial. Stamens free. Stigma simple or 2-lobed. Pod linear, terete or flat. Seeds many, in 1 or 2 rows in each cell, marginless. — (The Greek name of some plant of this family.)

A. Pubescence none or of simple hairs; stigma 2-lobed; pod firm.

B. Pod appressed, awl-shaped, 1-1.5 cm. long. W. E. — A bad weed.

S. officinale (HEDGE MUSTARD)

BB. Pod spreading, linear, 5-10 cm. long. W. E. — A bad weed.

S. altissimum (TUMBLING MUSTARD)

AA. Pubescence of stellate or occasional forked hairs or reduced to minute granules; stigma entire; pod delicate.

C. Seeds in 2 rows in each cell of the pod. E.

S. canescens

CC. Seeds in 1 row in each cell of the pod.

D. Leaves 1-2-pinnatifid, subglabrous; pod 0.6-1.5 cm. long.

E. Pod 10-14 mm. long, spreading. W. E.

S. incisum (WESTERN TANSY MUSTARD)

EE. Pod 3-6 mm. long, on ascending pedicels. W. E.

S. incanum

DD. Leaves 3-pinnate, canescent; pod about 2 cm. long. E.

S. sophia (FLIXWEED)

BRASSICA (MUSTARD)

Annual or biennial, coarse, erect. Basal leaves pinnatifid or lyrate; stem leaves dentate or nearly entire. Flowers large, in elongated racemes. Sepals equal or one pair saccate at base. Pod linear, sessile, terete, or somewhat 4-sided, not stipitate. Seeds in 1 row, globose, not margined. — (The Latin name of the Cabbage.) Cabbage, Cauliflower, Brussels Sprouts, Kohl-rabi, and Kale are merely cultivated varieties of *Brassica oleracea*.

A. Stem leaves auriculate and clasping at the base. W. E. — Cultivated for its root.

B. campestris (TURNIP)

AA. Stem leaves not auriculate nor clasping.

B. Pod beak less than $\frac{1}{2}$ as long as the fertile part, terete; pod glabrous. W. E.

B. nigra (BLACK MUSTARD)

BB. Pod beak $\frac{3}{4}$ -1 $\frac{1}{2}$ times as long as the fertile portion, flat or 2-edged.

C. Pod beak somewhat 2-edged but not flat; pod glabrous. W. E.

B. arvensis (WILD MUSTARD)

CC. Pod beak flat; pod hairy. W. — The ground seeds are table mustard.

B. alba (WHITE MUSTARD)

RAPHANUS (RADISH)

Annual or biennial, coarse. Leaves lyrate. Flowers showy. Petals large, clawed. Pod linear to lanceolate, distinctly beaked, transversely divided by false partitions, fleshy or corky. Seed spherical or nearly so. (Gk. *ra* = quickly, *phaino* = to appear; referring to the rapid germination.)

A. Flowers white or yellow; dry pod grooved lengthwise; seeds 2-10. E.

R. raphanistrum (WILD RADISH)

AA. Flowers white or pink or purple; dry pod not grooved lengthwise; seeds usually 2-3. W. E.

R. sativus (GARDEN RADISH)

BARBAREA (WINTER CRESS)

Biennial or perennial, glabrous, stems angled. Leaves entire or pinnatifid. Petals spatulate or clawed. Stamens free. Style short; stigma 2-lobed. Pod linear, somewhat 4-angled. — (Honor of St. Barbara, who used them medicinally.)

A. Pod ascending, 2.5-3 cm. long; flowers racemose even when opening. E.

B. vulgaris

AA. Pod appressed, 1-1.5 cm. long; flowers corymbosely aggregated when opening. W.

B. stricta

RORIPA (CRESS)

Leaves simple to pinnately compound, rarely entire. Flowers white or yellow. Sepals greenish yellow. Petals short-clawed. Stamens 1-6. Stigma entire to 2-lobed. Pod terete or nearly so, not stipitate. Seeds minute, turgid, wingless, in 2 rows in each cell. — (Said to be from Celtic *ros* = dew, *ripa* = a bank; referring to the habitat of some species.)

- A. Flowers white; leaves either pinnately divided or else very large.
- B. Leaves all pinnate; basal leaves 7.5-15 cm. long; pod linear; roots with mild radish taste. W. E. — Edible. **R. nasturtium** (WATER CRESS)
- BB. Rarely some of the lower leaves pinnate; basal leaves 45 cm. or less long; pod globular; roots with extremely strong radish taste. W. E. — Ground roots commonly eaten as a condiment. **R. armorica** (HORSE-RADISH)
- AA. Flowers yellow; leaves various, mostly pinnate, not extremely large.
- C. Perennial by running rhizomes; stems diffuse. E. **R. sinuata** (SPREADING YELLOW CRESS)
- CC. Annual or biennial, without rhizomes.
- D. Stems diffuse, branched from the base; pedicels 6-8 mm. long.
- E. Stem hispid; pod 3-5 mm. long. E. **R. hispida** (HAIRY CRESS)
- EE. Stem glabrous throughout or nearly so; pod 2-12 mm. long. W. E. **R. palustris** (MARSH CRESS)
- DD. Stems erect, simple below; pedicels 2-4 mm. long.
- F. Pod curved; leaf lobes acute. W. E. **R. curvisiliqua** (ARC CRESS)
- FF. Pod straight or nearly so; leaf lobes obtuse. E. **R. obtusa** (BLUNT CRESS)

CARDAMINE (BITTER CRESS)

Annual or perennial. Leaves entire to pinnately compound. Flowers white or purple, in racemes or corymbs. Petals obovate to narrowly spatulate. Stamens 4 or 6. Pod linear, not stipitate. Seeds in 1 row in each cell, flat, marginless. — (Gk. *kardia* = the heart, *damao* = to strengthen; from the cordial properties of some.)

- A. Leaves all simple.
- B. Leaves ovate to elliptic, entire; alpine. C. **C. bellidifolia** (ALPINE BITTER CRESS)
- BB. Leaves cordate to reniform, sinuate to toothed; subalpine. C. E. **C. cordifolia** (MOUNTAIN BITTER CRESS)
- AA. Leaves or some of them pinnately compound.
- C. Basal leaves simple; stem-leaves 3-5-foliolate. W. C. E. **C. breweri** (BREWER'S BITTER CRESS)
- CC. Basal leaves pinnately compound.
- D. Leaves all 3-foliolate or sometimes 5-foliolate; leaflets coarsely 3-5-toothed. W. C. **C. angulata** (3-LEAVED BITTER CRESS)
- DD. Leaves 3-13-foliolate, only the smaller leaves if any 3-5-foliolate; leaflets coarsely toothed in some species.
- E. Leaves 7-13-foliolate; leaflets of basal leaves orbicular. W. E. **C. pratensis** (CUCKOO FLOWER)
- EE. Leaves 3-7-foliolate.
- F. Flowers 2-3 mm. wide; leaflets petiolulate, lateral ones oblong. W. C. E. **C. parviflora** (SMALL BITTER CRESS)
- FF. Flowers 4-8 mm. wide.

- G. Leaflets petiolulate, roundish; seeds 8-20. W. C. C. oligosperma
 GG. Leaflets of the stem leaves tending to be decurrent along the leaf axis,
 lateral ones oblong to oval; seeds 20-40. W. C. E.
C. pennsylvanica (PENNSYLVANIA BITTER CRESS)

DENTARIA (TOOTHWORT)

Perennial; rhizome horizontal; stems erect, leafless below. Leaves palmately lacinate or 3-divided, petioled. Flowers white or rose or purple, in corymbs or short racemes. Pod linear, straight, flat, without stipe, dehiscent. Seeds 1 row in each cell, flat, wingless. — (L. *dens* = a tooth; referring to the toothlike projections of the rootstock.)

- A. Stem leaves of 3 petiolulate leaflets; basal leaves entire or with 3 leaflets. U. D. californica
 AA. Stem leaves either not completely divided into leaflets or these not petiolulate.
 B. Basal leaves round-cordate, crenate or sinuate; racemes few-flowered. W. C. D. tenella (DELICATE TOOTHWORT)
 BB. Basal leaves parted or divided into 3-5 segments; racemes densely many-flowered. U. C. E. D. macrocarpa

PHYSARIA (TWIN POD)

Perennial, low, stellate-hairy. Leaves mostly entire. Flowers in terminal racemes. Petals longer than the sepals. Style filiform. Pod membranous, stellate-pubescent; partition narrow; cells subglobose, several-seeded. Seed not margined. — (Gk. *physis* = a bladder; the pod is inflated.)

- A. Mature pod much inflated, 1.2-1.7 cm. wide, its upper sinus acute. E. P. didymocarpa
 AA. Mature pod but little inflated, its upper sinus shallow and rounded.
 B. Pedicels 6 mm. long; pod 5-8 mm. wide, its partition ovate. E. P. geyeri
 BB. Pedicels 12 mm. or more long; pod 10-20 mm. wide, its partition narrowly linear. E. P. oregana

LESQUERELLA (BLADDER POD)

Annual or perennial, low. Leaves entire or repand-dentate. Petals spatulate to obovate, entire. Valves of pod veinless; partition hyaline, veined from apex to middle. Seeds rounded, flat. — (Diminutive, honor of L. Lesquereux, an American bryologist.)

- A. Hairs stellate; pod obovate, its cells 2-ovuled. E. L. douglasii
 AA. Hairs not stellate; pod oval, its cells 4-ovuled. E. L. occidentalis

CAMELINA (FALSE FLAX)

Annual, erect. Leaves entire to pinnatifid. Sepals somewhat colored. Petals spatulate to obovate, clawed. Valves of pod strongly convex; partition obovoid, persistent. Seeds in 2 rows in each cell, many, wingless. — (Gk. *chamai* = a dwarf, *linon* = flax.)

- A. Pod 6-7 mm. wide; plant glabrous or nearly so. W. E. C. sativa
 AA. Pod 4-5 mm. wide; plant pubescent at least below. E. C. microcarpa

DRABA (WHITLOW-GRASS)

Annual or perennial, low, tufted. Leaves simple, entire or toothed. Flowers white or yellow. Pod elliptic to linear, flat, dehiscent. Seeds wingless, in 2 rows in each cell. — (Gk. *drabe* = biting; referring to the sharp taste.) Too difficult for beginners.

THYSANOCARPUS (LACE POD)

Annual, slender, erect, sparingly branched. Basal leaves toothed or pinnatifid. Flowers minute, white or rose, in long racemes. Pod plano-convex, 1-celled, 1-seeded. Seed somewhat flat, margined. — (Gk. *thysanos* = a fringe, *karpós* = a fruit or body; referring to the wing-margined pod.)

- A. Upper leaves lanceolate or linear-lanceolate; pod not radiately veined; pedicels 4–8 mm. long. E. **T. curvipes** (FRINGED LACE POD)
 AA. Upper leaves ovate-lanceolate or ovate-oblong; pod radiately veined; pedicels 8–17 mm. long. U. **T. radians** (RADIATE LACE POD)

SMELOWSKIA

Herbs, perennial, low, caespitose; pubescence simple or stellate. Leaves 1–2-pinnatifid. Flowers small, white, in terminal racemes. Petals obovate or spatulate, longer than the sepals. Stigma sessile. Pod lanceolate or lance-oblong; valves sharply keeled. Seeds few. — (Evidently named after some Russian.)

- A. Capsule lanceolate, attenuate at each end; petals $1\frac{1}{2}$ times as long as the sepals. W. C. E. **S. calycina**
 AA. Capsule ovate, obtuse to subcordate at base, acute to attenuate at apex; petals $1\frac{1}{2}$ times as long as the sepals. W. C. **S. ovalis**
 AAA. Capsule linear, obtuse at base, acuminate at apex; petals 3 times as long as the sepals. U. **S. fremontii**

ARABIS (ROCK CRESS)

Herbs. Flowers white or purple, in bractless racemes. Sepals equal or the lateral ones saccate at base. Pod linear, flattened parallel to the partition. Seeds in 1–2 rows in each cell. — (Named after Arabia, the country where first found.) Too difficult for beginners.

ERYSIMUM (WALL-FLOWER)

More or less pubescent or hoary. Leaves simple. Stigma lobed. Pod linear. Seed oblong. — (Gk. *eryein* = to draw blisters; a property of the ground seeds of many plants of this family.)

- A. Petals 4–5 mm. long; pod 1–2 cm. long. E. **E. cheiranthoides** (TREACLE MUSTARD)
 AA. Petals 6–25 mm. long (unknown in *E. arenicola*); pod 2.5–10 cm. long.
 B. Pod terete or 4-angled.

C. Petals 6-10 mm. long; pod 2.5-5 cm. long. E.

E. *parviflorum* (SMALL WALL-FLOWER)

CC. Petals 12-25 mm. long; pod 5-12.5 cm. long.

D. Seed 4-angled. W. C. E.

E. *asperum*

DD. Seed lens-shaped. C. E.

E. *elatum*

BB. Pod flattened parallel to the partition.

E. Biennial; stems simple, not caespitose. W.

E. *arenicola*

EE. Perennial; stems branched, caespitose. E.

E. *occidentale*

CAPPARIDACEAE (CAPER FAMILY)

Annual herbs, often *with a radish or turnip taste*. Leaves alternate; ternately- or palmately-compound; stipules none. Flowers perfect, in racemes. Sepals 4-8. Petals 4 or rarely more. *Stamens* 4-32, *not tetradynamous*, on the receptacle. *Ovary* 1-celled; placentae 2, parietal; style 1. Fruit a pod, elliptic to linear, pedicelled. Seeds many.

A. Stamens 6; pods pendulous, long stiped, opening from the base upward.

CLEOME (p. 116)

AA. Stamens 12-19; pods erect, unstiped; opening from the tip downward.

E. — (Gk. *polys* = many, *anisos* = not equal; referring to the stamens.)

Polanisia trachysperma (CLAMMY-WEED)

CLEOME

Erect, branched. Leaves palmately 3-8-foliolate. Pod opening from the base upward. — (Gk. *kleio* = to close; referring to the flower.)

A. Leaflets 3; calyx 4-cleft; petals white to purplish. E.

C. *serrulata* (STINKING CLOVER)

AA. Leaflets 5 or on the upper leaves 3; calyx 4-cleft; petals yellow. E.

C. *lutea* (STINKING MUSTARD)

AAA. Leaflets 3; calyx of 4 distinct sepals; petals yellow. E.

C. *platycarpa*

SARRACENIACEAE (PITCHER-PLANT FAMILY)

Marsh herbs. Leaves all basal, tubular or pitcher-shaped. Flowers large, nodding, on scapes. Sepals 5, persistent. Petals 5, hypogynous. Stamens many; anthers versatile. Ovary 5-celled; style lobed. Capsule loculicidal. *Seeds* many, *densely soft-spiny*. U. — (Honor of Wm. Darlington, an American botanist.)

Darlingtonia californica (PITCHER PLANT)

DROSERACEAE (SUNDEW FAMILY)

Herbs, biennial or perennial, *glandular-pubescent, exuding a copious clear viscid liquid*. Leaves mostly basal. Flowers perfect. Calyx persistent, 4-5 parted or segmented. Petals 5, distinct or

nearly so. Stamens 4-20. *Ovary* free, globose or ovoid, 1-5-celled; styles 1-5, simple to 2-parted. Capsule many-seeded. — Only the following genus.

DROSERA (SUNDEW)

Plants of peat bogs, often reddish. Leaves with glandular hairs which hold insects. Flowers in scapose racemes. — (Gk. *droseros* = dewy; the leaf glands exude drops of clear liquid.)

A. Leaf blade not longer than wide, orbicular or transversely elliptic. W. E.

D. *rotundifolia* (ROUND-LEAVED SUNDEW)

AA. Leaf blade much longer than wide, linear to obovate-spatulate. C.

D. *anglica* (LONG-LEAVED SUNDEW)

CRASSULACEAE (STONECROP FAMILY)

Herbs, mostly fleshy. *Leaves* alternate or opposite, *fleshy*; stipules none. *Flowers* cymose, or rarely racemose or solitary, regular. Calyx persistent, mostly 4-5-parted or -lobed. Petals 0 or 4 or 5, distinct or somewhat united. Stamens as many or twice as many as the petals. Carpels 4-5, superior, distinct or united below. *Fruit* a *follicle*, 1-celled, opening along the inner edge. Seeds minute, 1 to many, in 2 rows.

A. Leaves opposite.

B. Flowers solitary in the leaf axils; leaves 2-6 mm. long; petals greenish, not over 2 mm. long.

TILLAEASTRUM (p. 117)

BB. Flowers clustered in the leaf axils; leaves 1.5-3 mm. long; petals greenish, about 1 mm. long. U. C. — (Honor of M. A. Tilli, an Italian botanist.)

Tillaea *erecta* (PIGMY WEED)

BBB. Flowers in terminal cymes; leaves 5-8 mm. long; petals yellow, about 6 mm. long.

SEDUM (p. 118)

AA. Leaves alternate.

C. Petals more or less united.

D. Corolla tubular, yellow, its lobes erect; basal leaves acute. U. — (Honor of W. R. Dudley, an American botanist.)

Dudleya *farinosa*

DD. Corolla short-campanulate or rotate, yellow or red, its lobes spreading; basal leaves obtuse.

GORMANIA (p. 118)

CC. Petals distinct.

SEDUM (p. 118)

TILLAEASTRUM (PIGMY WEED)

Annual, glabrous, small or minute; sometimes aquatic. Leaves opposite, entire. Sepals mostly 4, distinct. Petals distinct or united at base. Carpels distinct.—(Possibly *Tillaea*; + *L. aster* = a contemptuous diminutive suffix; from their lack of beauty.)

A. Leaves obtuse; flowers sessile or nearly so. E.

T. *aquaticum*

AA. Leaves acute; with pedicels at least equal to the calyx. E.

T. *drummondii*

GORMANIA

Low, *Sedum*-like, perennial by horizontal rootstocks. Leaves spatulate to orbicular; stem leaves smaller. Flowers cymose or thyrsoïd. Stamens 10, on the corolla. Carpels many-seeded, united below, erect or nearly so even in fruit. — (Honor of M. W. Gorman, an American botanist.)

- A. Corolla red or pink. U. G. laxa
- AA. Corolla yellow.
- B. Corolla segments long-acuminate, much exceeding the filaments. W. C. E. G. oregana
- BB. Corolla segments acute to acuminate, little longer than the filaments.
- C. Leaves spatulate. E. G. watsoni
- CC. Leaves orbicular. E. G. debilis

SEDUM (STONECROP)

Flowers clustered; clusters often 1-sided. Calyx 4-5-lobed or -parted. Petals distinct or united at base, in ours yellow or purple. Stamens 8 or 10. Carpels distinct or united at the very base, few- to many-seeded. — (*L. sedere* = to sit; because the basal tuft of leaves is often flat on the rocks.)

- A. Leaves spatulate or obovate, widest above their middle, flat.
- B. Flowers purple, dioecious; racemes not 1-sided. C. E. S. integrifolium
- BB. Flowers yellow, perfect; racemes 1-sided.
- C. Follicles erect or nearly so; leaves with line of pits underneath near margin. W. E. S. spathulifolium
- CC. Follicles widely spreading; leaves without a line of pits.
- D. Leaves of sterile shoots opposite; cyme branches short, mostly simple. W. C. E. S. divergens
- DD. Leaves alternate; cyme branches long, forked.
- E. Biennial, 2.5 dm. or less high, not forming offsets. C. S. leibergii
- EE. Perennial, 1 dm. or less high, forming offsets. W. S. woodii
- AA. Leaves linear to ovate, widest at or below their middle, terete or flat.
- F. Perennial; leaves linear to lanceolate.
- G. Leaves linear, not ciliate; follicles erect or nearly so. W. C. E. S. stenopetalum
- GG. Leaves linear-lanceolate to lanceolate; follicles widely spreading.
- H. Leaves not ciliate. W. C. E. S. douglasii
- HH. Lower leaves ciliate. U. S. ciliolum
- FF. Annual; leaves oblong or ovate-oblong, 5-12 mm. long, 2-4 mm. wide. W. S. radiatum

SAXIFRAGACEAE (SAXIFRAGE FAMILY)

Herbs, but sometimes shrubby. Leaves opposite or alternate, simple or compound, *often palmately veined*. Flowers mostly perfect. Sepals 4-5, united to nearly distinct. Petals 0 or 4 or 5, alternate with the sepals. Stamens as many or twice as many as the sepals, rarely fewer, *on the calyx*. Ovary superior or partly inferior,

1-3-celled or rarely more-celled; placentae parietal or axial; styles distinct or somewhat united. Fruit a capsule; *follicles* usually *separate at tip*. Seeds several to many.

A. Leaves centrally peltate, orbicular, 9-14-lobed, sharply serrate, 1-4 dm. wide.

C. — (Gk. *pelle* = a small shield, *phyllon* = a leaf; the leaves are peltate.)

Peltiphyllum peltatum

AA. Leaves not peltate.

B. Leaves entire.

C. Leaf blade widest below its middle; flowers solitary; staminodia present; carpels 3-4, united.

PARNASSIA (p. 123)

CC. Leaf blade widest at or above its middle; flowers not solitary; staminodia none; carpels 2, distinct at least above.

SAXIFRAGA (p. 120)

BB. Leaves not entire.

D. Either ovary 2-celled and placentae axial or basal, or else carpels separate.

E. Stamens 10; leaf blade widest above its middle or else narrower than ovate (except in many *Saxifraga*).

F. Carpels distinct; leaves 2.5-15 cm. long, coriaceous, glabrous on both sides, coarsely serrate above the middle. W. C. — (Gk. *leptos* = small, *arren* = male; probably referring to the 1-celled anthers.)

Leptarrhena pyrifolia

FF. Carpels united at least below; leaves not as above in all points.

G. Leaf blade jointed to the petiole. U. — (*Saxifraga* is another genus of plants; Gk. *opsis* = form; hence *Saxifraga*-like.) **Saxifragopsis fragarioides**

GG. Leaf blade not jointed to the petiole.

SAXIFRAGA (p. 120)

EE. Stamens 5; leaf blade either widest at or below its middle and ovate or wider, or else 3-5-foliate.

H. Ovary free from the calyx tube, superior. C. — (Honor of H. N. Bolander, an American botanist.)

Bolandra oregana

HH. Ovary partly united to the calyx tube, partly inferior.

I. Rhizome short, bulblet-bearing, with terminal flower stalk.

HEMIEVA (p. 120)

II. Rhizome elongated and horizontal, without bulblets, with lateral flower stalk.

J. Sepals imbricate; petals persistent; seed winged. W. E. — (Honor of W. S. Sullivant, an American bryologist.)

Sullivantia oregana

JJ. Sepals valvate; petals deciduous; seed wingless.

BOYKINIA (p. 120)

DD. Ovary 1-celled; placentae parietal or basal.

K. Sepals 4; petals 0 or 4; stamens 3 or 8.

L. Flowers solitary in the forks of the upper branches; petals none; stamens 8; leaves crenate but not lobed, never with young plants where blade joins petiole. W. C. — (Gk. *chrysos* = gold, *splen* = the spleen; on account of some reputed medicinal property.)

Chrysosplenium glechomaefolium (GOLDEN SAXIFRAGE)

LL. Flowers in racemes; petals 4; stamens 3; leaves lobed, often with young plant where blade joins petiole. W. C. — (Gk. *leptos* = slender; + axis; referring to the raceme.)

Leptaxis menziesii (YOUTH-ON-AGE)

KK. Sepals 5; petals 5; stamens 5 or 10.

M. Carpels 3.

LITHOPHRAGMA (p. 122)

MM. Carpels 2.

N. Inflorescence a panicle.

O. Stamens 10; leaves 3-foliolate (except *T. unifoliata*).

TIARELLA (p. 120)

OO. Stamens 5; leaves simple.

HEUCHERA (p. 121)

NN. Inflorescence a raceme.

P. Stamens 10.

TELLIMA (p. 122)

PP. Stamens 5.

Q. Flowering branches leafless.

MITELLA (p. 122)

QQ. Flowering branches leafy.

R. Sepals triangular; petals pinnatifid. (See Q.)

RR. Sepals ovate; petals entire to 3- or 5-cleft at apex. (See P.)

BOYKINIA

Perennial, glandular-pubescent. Flowers in panicles. Leaf blades reniform, variously cleft or lobed, dentate or crenate. Calyx segments 5. Petals white or purple. Stamens 5, opposite the sepals. Ovary $\frac{1}{2}$ inferior, 2-celled; styles 2. Follicle beaks 2, divergent. Seeds shining. — (Honor of a Dr. Boykin, of Georgia.)

A. Petals white.

B. Stipules none or mere bristles. W. C.

B. major

BB. Stipules wider, scarious or foliaceous. W. C.

B. occidentalis

AA. Petals dark purple. E.

B. heucheriformis

HEMIEVA

Perennials, glandular-puberulent. Basal leaves ternately divided or crenate only. Flowers in a panicle. Calyx segments 5. Petals obovate. Stamens 5, opposite the sepals. Ovary $\frac{1}{2}$ – $\frac{2}{3}$ inferior, 2-celled; styles 2. — (Possibly Gk. *hemi* = $\frac{1}{2}$, L. *aevum* = an age; in reference to its half-perennial form, through budding in the leaf axils.)

A. Petals white, with short claw; ovary $\frac{1}{2}$ inferior. C. E.

H. ranunculifolia

AA. Petals violet, with long claw; ovary $\frac{2}{3}$ inferior. E.

H. violacea

SAXIFRAGA (SAXIFRAGE)

Herbs, but sometimes shrubby, chiefly perennial. Leaves alternate, simple. Flowers small, in clusters. Sepals 5. Petals on the calyx tube when there is one, entire or 2-toothed. Stamens 10. Carpels usually 2, rarely 3–6; ovary of as many cells; fruit with as many beaks. — (L. *saxum* = rock, *frangere* = to break; because many species grow in rock clefts.) Species too difficult for beginners. (F. & R. pp. 197–199.)

TIARELLA (COOLWORT)

Perennial. Stipules present. Flowers in racemes or panicles. Calyx tube small, short-campanulate. Petals clawed or filiform. Stamens

exserted. Ovary almost entirely superior; placentae 2, parietal but almost basal. Capsule membranous. — (Diminutive of *G. tiara* = a mitre or turban; from the form of the pistil.)

- A. Leaves merely 3-5-lobed. C. E. *T. unifoliata*
 AA. Leaves with 3 leaflets.
 B. Leaflets coarsely dentate. W. C. *T. trifoliata* (3-LEAVED COOLWORT)
 BB. Leaflets deeply lobed or cleft. W. C. *T. laciniata*

HEUCHERA (ALUMROOT)

Perennial. Calyx tube various, often oblique; segments often very unequal. Petals clawed. Ovary partly inferior; placentae 2, parietal; styles 2, distinct. Capsule 2-beaked. — (Honor of J. H. Heucher, a German botanist.)

- A. Flowers in a loose panicle.
 B. Calyx cup about as long as wide; stamens at least twice as long as the free calyx segments.
 C. Lobes of the basal leaves acute. W. C. E. *H. glabra*
 CC. Lobes of the basal leaves rounded.
 D. Basal leaf blades decidedly longer than wide.
 E. Petioles and stems glabrous. C. *H. glaberrima*
 EE. Petioles and lower portion of the stems hairy. W. C. *H. diversifolia*
 DD. Basal leaf blades not or hardly longer than wide. W. C. E. *H. micrantha*
 BB. Calyx cup about twice as long as wide; stamens $1\frac{1}{2}$ -2 times as long as the free calyx segments.
 F. Leaf blades cordate at base. E. *H. rubescens*
 FF. Leaf blades cuneate to rounded at base. E. *H. cuneata*
 AA. Flowers in a spike or a spikelike panicle.
 G. Stamens about equaling the free calyx segments; calyx cup hemispheric, densely hairy. W. *H. pilosissima*
 GG. Stamens much shorter than the free calyx segments; calyx cup various, sometimes hairy.
 H. Calyx 3-5 mm. long, its cup saucer-shaped to shortly campanulate.
 I. Lobes of the leaf blades again 3-lobed. E. *H. gracilis*
 II. Lobes of the leaf blades not again lobed.
 J. Calyx campanulate, white or yellowish or pinkish, the free segments almost erect.
 K. Plants glabrous or glandular-pubescent merely on scape and inflorescence. C. E. *H. hallii*
 KK. Plants more or less glandular-hirsute. (See NN.)
 JJ. Calyx saucer-shaped, green, the free segments spreading. E. *H. parvifolia*
 HH. Calyx 5-10 mm. long, its cup deeply campanulate to urn-shaped.
 L. Calyx greenish.
 M. Petioles and flowering branches villous. W. *H. cylindrica*
 MM. Petioles and flowering branches glabrous or minutely glandular-puberulent. E. *H. tenuifolia*
 LL. Calyx yellowish.
 N. Leaf lobes deep, broadly ovate. C. *H. suksdorfii*
 NN. Leaf lobes shallow, rounded.
 O. Leaf blade densely glandular-pubescent. C. E. *H. ovalifolia*
 OO. Leaf blade glabrous or hairy only on the veins or merely puberulent. E. *H. glabella*

LITHOPHRAGMA

Perennial. Calyx cup campanulate to turbinate. Petals white or rose colored, clawed, entire to divided, much exceeding the sepals. Stamens 10, included. Ovary $\frac{1}{3}$ – $\frac{1}{2}$ inferior, placentae parietal; styles 3, short. — (Gk. *lithos* = a stone, *phragma* = an inclosure; probably referring to the hard capsule.)

A. Calyx tube campanulate; ovary almost wholly superior.

B. Petals about 12 mm. long; calyx tube more than 3 mm. wide. U.

L. *campanulata*

BB. Petals 2–7 mm. long; calyx tube less than 3 mm. wide. W. C. E.

L. *tenella* (BABY'S BREATH)

AA. Calyx tube turbinate or obconic; ovary $\frac{1}{2}$ inferior.

C. Stem 1–3 dm. high; leaf blades divided to near the base; calyx tube elongated-obconic. U.

L. *affinis*

CC. Stem 3–5 dm. high; leaf blades not divided to near the base; calyx tube short-turbinate. W. E.

L. *parviflora*

TELLIMA (FRINGE CUP)

Perennial, hairy. Stipules small. Flowers in racemes. Calyx cup urn-shaped to deeply campanulate. Petals white or tinged with purple, spreading; claw cuneate; blade pinnately divided. Stamens 10, short, included. Ovary almost completely superior, placentae parietal; styles 2. — (An anagram of *Mitella*.)

A. Only base of ovary adnate to calyx; calyx tube 8 mm. long; flowers not fragrant. W. C.

T. *grandiflora*

AA. Lower half of ovary adnate to calyx; calyx tube 6 mm. or less long.

B. Flowers fragrant; petals pinnately divided, spreading; calyx cup 5–6 mm. long. W.

T. *odorata*

BB. Flowers not fragrant; petals 3–5-cleft at apex, or entire, erect; calyx cup 4 mm. long. W. C. E.

T. *racemosa*

MITELLA (BISHOP'S-CAP)

Perennial, low, slender. Flowers small, variously clustered. Calyx short, 5-cleft. Petals slender. Stamens 5 or 10, included. Ovary from $\frac{1}{3}$ to wholly inferior; placentae 2, parietal or basal; styles 2, very short. Capsule short, 2-beaked, 2-valved at summit. — (Diminutive of L. *mitra* = a mitre or cap; referring to the form of the young pod.)

A. Calyx green; petals pinnatifid.

B. Ovary almost wholly superior; stigmas entire; stems 1–3-leaved; plant with summer runners. W. C. E.

M. *caulescens*

BB. Ovary almost wholly inferior; stigmas 2-lobed; stems leafless; plant without summer runners.

C. Stamens alternate with the sepals. W. C. E.

M. *pentandra*

CC. Stamens opposite the sepals.

D. Leaves ovate-cordate. W.

M. *ovalis*

DD. Leaves broadly reniform-cordate. C.

M. *breweri*

AA. Calyx white; petals trifid or entire.

E. Leaves angularly lobed; calyx lobes acute; petals 3-cleft. **E.** **M. diversifolia**

EE. Leaves not angularly lobed; calyx lobes obtuse.

F. Petals entire. **E.**

M. micrantha

FF. Petals 3-cleft or -parted.

G. Raceme not secund; midveins of sepals branched; petals 3-cleft, their lobes not divaricate. **W. C. E.**

M. trifida

GG. Raceme secund; midveins of sepals simple; petals 3-parted, their lobes divaricate. **E.**

M. stauropetala

PARNASSIA (GRASS OF PARNASSUS)

Glabrous, scapose. Leaves palmately veined, the basal petioled; stem leaf 1, sessile. Calyx 5-lobed. Petals pale yellow or white. Fertile stamens 5, opposite the sepals; sterile stamens generally many, in a cluster at the base of each petal. Ovary superior or partly inferior, 1-celled; placentae 4. — (Named by the Greeks after Mt. Parnassus.)

A. Leaves ovate to broadly oval; petals 16–20 mm. long, not fimbriolate at base; sterile stamens 20–24 in a group. **U.**

P. californica

AA. Leaves cordate to reniform; petals 8–13 mm. long, very much fimbriolate at base; sterile stamens 5–9 in a group. **W. C. E.**

P. fimbriata

HYDRANGEACEAE (SYRINGA FAMILY)

Shrubs. *Leaves opposite*, simple, deciduous, 3-veined from the base; stipules none. Sepals 4–10, united below, in sterile flowers often conspicuously enlarged. Petals as many as the sepals. Stamens 8 to many; filaments long. *Ovary wholly or partly inferior; carpels 2–10, united. Capsule urn-shaped to conic or rarely globose.* Seeds 1 to many in each carpel.

A. Low, spreading or trailing; stamens 10–12 or fewer; ovule and seed only 1 in each carpel; capsule beakless. **W.** — (Honor of A. W. Whipple, who commanded a survey on the Pacific coast.)

Whipplea modesta (WHIPPLEA)

AA. Tall, erect or spreading; stamens many; ovules and seeds many in each carpel; capsule beaked by the persistent style.

PHILADELPHUS (p. 123)

PHILADELPHUS (SYRINGA)

Leaves toothed to entire. Flowers perfect. Sepals 4–5, persistent. Petals white, conspicuous. Stamens 25–60. Ovary at least $\frac{2}{3}$ inferior, 3–5-celled. Capsule obovoid, somewhat woody or leathery, loculicidal. Seeds many. — (Honor of King Ptolemy Philadelphus, of Egypt.)

A. Lower leaf surface pubescent all over; styles united for $\frac{2}{3}$ their length. **W. C.**

P. gordonianus

AA. Lower leaf surface pubescent only on the veins; styles united for $\frac{1}{2}$ their length or rarely more. **E.**

P. lewisii

GROSSULARIACEAE (GOOSEBERRY FAMILY)

Shrubs; stems often prickly, sometimes with spines at base of petiole. Leaves alternate, simple, petioled, deciduous, palmately veined, dentate to lobed; stipules none or adnate to the petiole. Flowers bracted, small, regular, on short axillary branches, solitary or clustered. Sepals 4-5, distinct or united at base. Petals 4-5, small, on the calyx. Stamens 4-5. Ovary inferior; style 2-3-lobed. Fruit a berry. Seeds several to many.—Only the following genus.

RIBES (GOOSEBERRY OR CURRANT)

(The Arabic name.) The fruits of many are edible. The cultivated gooseberry is *R. oxycanthoides*.

- A. Stems not spiny nor prickly; pedicels jointed beneath the ovary, and fruit breaking off at this point. (CURRANTS)
- B. Flowers yellow.
 - C. Calyx segments 5-8 mm. long; calyx tube 2-3 times as long as wide; berry yellow or red or black. E. *R. aureum* (GOLDEN CURRANT)
 - CC. Calyx segments 3 mm. long; sepals but very little united at base; berry red. C. E. *R. erythrocarpum*
- BB. Flowers white or green or red.
 - D. Calyx tube saucer-shaped or almost none.
 - E. Ovary glabrous; berry red, smooth.
 - F. Sepals usually somewhat purplish; petals red; anther cells parallel. C. E. *R. triste* (SWAMP RED CURRANT)
 - FF. Sepals and petals yellowish green; anther cells widely divergent. W. E. — Cultivated for the fruit. *R. vulgare* (GARDEN RED CURRANT)
- EE. Ovary hairy or glandular; berry black, hairy or glandular.
 - G. Sepals greenish; berry without a bloom. E. *R. hudsonianum*
- GG. Sepals white; berry with a bloom.
 - H. Ovary with sessile glands; bracts of the inflorescence widest above their middle; leaves 5-20 cm. wide, 5-7-lobed. W. C. *R. bracteosum* (STINK CURRANT)
 - HH. Ovary with stalked glands; bracts of the inflorescence widest below their middle; leaves 5-10 cm. wide, 3-5-lobed.
 - I. Bracts about equaling the pedicels; racemes pendent. W. C. *R. acerifolium*
 - II. Bracts not more than $\frac{1}{2}$ the length of the pedicels; racemes erect or ascending. W. C. *R. laxiflorum*
- DD. Calyx tube campanulate or cylindric.
- J. Racemes usually 10-20-flowered; sepals red or rose; anthers without an apical gland.
 - K. Leaves white-tomentose beneath; ovary with some curled whitish hairs among the gland hairs; calyx 8-12 mm. or less long. W. C. *R. sanguineum* (RED-FLOWERED CURRANT)
 - KK. Leaves not tomentose; ovary with gland hairs only; calyx 6 mm. long. C. E. *R. nevadense* (ROSE-FLOWERED CURRANT)

- JJ.** Racemes usually fewer than 10-flowered; sepals white or greenish; anthers with a conspicuous cup-shaped apical gland.
L. Leaves glandular-dotted; inflorescence pendulous; berry red or orange, glabrous or slightly glandular. **E.** **R. cereum** (SQUAW CURRANT)
LL. Leaves densely glandular-pubescent; inflorescence spreading or ascending; berry black, glandular. **E.** **R. viscosissimum** (STICKY CURRANT)
AA. Some of the stems either spiny or prickly, or both. (GOOSEBERRIES)
M. Flowers more than 4 in a cluster; calyx tube saucer-shaped; berries glandular.
N. Leaves glabrous or nearly so; berries black; racemes mostly 10-15-flowered. **W. C. E.** **R. lacustre** (SWAMP GOOSEBERRY)
NN. Leaves pubescent or glandular; berries red; racemes mostly 3-7-flowered. **E.** **R. lentum**
MM. Flowers 1-4 in a cluster; calyx tube campanulate or cylindric.
O. Berry spiny or densely glandular-hairy or velvety-pubescent.
P. Calyx green or yellow.
Q. Berry velvety-pubescent; leaves 1-1.2 cm. wide; sepals yellow; petals yellow. **U.** **R. velutinum**
QQ. Berry bristly; leaves 2-6 cm. wide; sepals green; petals white.
R. Stem trailing; leaves densely pubescent beneath; petiole not glandular; anthers exerted. **U.** **R. binominatum**
RR. Stem erect or ascending; leaves pubescent beneath on the veins only; petiole glandular; anthers included. **C. E.** **R. watsonianum**
PP. Calyx purplish to red.
S. Young twigs densely bristly. **U.** **R. menziesii**
SS. Young twigs not or very scantily bristly.
T. Anthers mucronate-tipped; ovary not glandular; berry 1-2 cm. long, bristly. **U.** **R. roezli**
TT. Anthers not mucronate-tipped; ovary densely stalked-glandular; berry 1-2 cm. long, densely glandular. **W. C.** **R. lobbii** (GUMMY GOOSEBERRY)
TTT. Anthers not mucronate-tipped; ovary not glandular; berry 2.5 cm. or more long, fleshy-spiny. **U.** **R. marshallii**
OO. Berries smooth.
U. Calyx lobes longer than the tube; stamens decidedly longer than whole calyx.
V. Calyx white, its segments narrowly lanceolate. **E.** **R. niveum**
VV. Calyx greenish purple, its segments oblong. **W. C. E.** **R. divaricatum**
UU. Calyx lobes equal to or shorter than the tube.
W. Bracts much shorter than the pedicels; stamens scarcely longer than the whole calyx. **E.** **R. saxosum**
WW. Bracts nearly equaling the pedicels; stamens decidedly shorter than the whole calyx.
X. Leaves 1.5-4 cm. wide; calyx tube slightly hairy, much longer than wide, cylindric; calyx segments 2-4 mm. long. **E.** **R. cognatum**
XX. Leaves 3-7 cm. wide; calyx tube glabrous, hardly longer than wide, campanulate; calyx segments 5-8 mm. long. **E.** **R. irriguum**

ROSACEAE (ROSE FAMILY)

Herbs or shrubs. Leaves usually alternate; stipules usually present. Flowers solitary or clustered. Sepals normally 5, rarely 4 or 6-9, often united at base. Petals as many as the sepals, or none. *Stamens* 1 to many, usually on the calyx. Pistils 1 to many, usually wholly distinct. Ovary 1-celled. Fruit akenes or

follicles or drupelets. Seeds 1 to few. — Most difficult groups have keys to genera only. (F. & R. pp. 206-221.)

A. Shrubs.

B. Leaves simple; plants not vines.

C. Leaves 3-lobed at apex, fascicled, 6-25 mm. long, cuneate-obovate, white-tomentose beneath; plant 6-24 dm. high. E. — (Honor of Otto Kuntze, a botanist.) **Kunzia tridentata** (ANTELOPE BRUSH)

CC. Not as above in all points.

D. Leaves pinnately veined, or 1-veined, in some pinnately lobed.

E. Petals none; styles very long and plumose in fruit; carpels 1-seeded.

CERCOCARPUS (p. 131)

EE. Petals present; styles not plumose in fruit; carpels 2- to several-seeded (except *Holodiscus*).

F. Erect, branching; inflorescence not spicate; leaves not rosulate, not entire.

G. Leaves ovate, shallowly lobed; stamen disk adherent, entire; ovules 2; seed 1. **HOLODISCUS** (p. 129)

GG. Leaves mostly narrower than ovate, not lobed, but often coarsely serrate; stamen disk free at margin, not entire; ovules several; seeds several. **SPIRAEA** (p. 128)

FF. Depressed-caespitose; inflorescence spicate; leaves rosulate, entire.

PETROPHYTUM (p. 128)

DD. Leaves palmately veined, palmately-lobed or -cleft.

H. Stems 1 dm. or less long, caespitose, creeping; plant alpine; leaves 3-parted and the segments again 2-4-lobed; flowers in racemes. W. C. — (Honor of F. P. Lutke, a Russian explorer.) **Lutkea pectinata** (PARTRIDGE FOOT)

HH. Stems 5-24 dm. high, not caespitose, erect or ascending or divaricate; plant not alpine; leaves 3-5-lobed halfway to the midvein or shallower; flowers in corymbs. **PHYSOCARPUS** (p. 128)

BB. Either the leaves compound, or else the plants vines.

I. Leaves compound; leaflets entire.

J. Leaves 2-pinnate; leaflets many; petals white; twigs stellate-tomentose. E. — (Gk. *chamai* = on the ground, *batis* = a starfish; referring to the low spreading form.) **Chamaebatiaria millefolium**

JJ. Leaves 1-pinnate; leaflets 5-7; petals yellow; twigs silky-villous. W. C. E. — (Gk. *dasy* = shaggy, *phoros* = bearing; from the densely villous akenes.) **Dasiphora fruticosa** (SHRUB 5-FINGER)

II. Either leaves simple or leaflets not entire.

K. Fruit of drupelets usually united to form a pulpy berry; shrubs or herbs, some trailing, smooth or prickly. **RUBUS** (p. 131)

KK. Fruit a globular or flask-shaped fleshy receptacle containing a few bony akenes; shrubs, none trailing, prickly. **ROSA** (p. 132)

AA. Herbs.

L. Leaves simple, 4-12 mm. long, deeply 3-lobed, the lobes 2-4-cleft; plant 2.5-20 cm. high; petals none. W. C. E. — (*Alkemelyeh* is the Arabic name.)

Alchemilla arvensis (LADY'S MANTLE)

LL. Not as above in all characters; petals present at most.

M. Leaves ternately many times compound. W. C. E. — (*L. aruncus* = the beard of a goat; probably suggested by the long spikes of white flowers.)

Aruncus aruncus (GOAT'S BEARD)

MM. Leaves not ternate, or if so leaflets only 3.

N. Leaves palmately- or ternately-veined or -lobed or -compound.

O. Fruit of a few fleshy drupelets; vines, alpine; leaves scattered, alternate, distant.

RUBUS (p. 131)

OO. Fruit of dry akenes; not vines with scattered distant leaves.

P. Leaves all 3-foliolate.

Q. Flowers white; plants with runners which give rise to new plants at the joints; leaves all basal.

FRAGARIA (p. 129)

QQ. Flowers yellow; plants without runners; leaves usually not all basal.

R. Petals oblanceolate; stamens 5; style lateral; leaflets 6-25 mm. long, 3-5-toothed at the apex. W. C. E. — (Honor of R. Sibbald, a Scotch botanist.)

Sibbaldia procumbens

RR. Petals wider; stamens 20; style terminal or nearly so; leaflets often longer, usually with more teeth. (See PP.)

PP. Leaves or some of them not 3-foliolate.

POTENTILLA (p. 129)

NN. At least the basal leaves pinnately-veined or -lobed or -compound.

S. Leaves simple, coarsely toothed; alpine caespitose plant; petals 8-9.

C. E. — (Gk. *dryad* = a wood nymph; from the forest habitat.)

Dryas octopetala (ALPINE AVENS)

SS. Leaves either compound or deeply dissected; petals not 8-9.

T. Calyx surrounded by a dense border of hooked prickles. W. — (Gk. *agros* = a field, *monos* = alone; the chief of the field, from its medicinal properties.)

Agrimonia gyrosepala (AGRIMONY)

TT. Calyx not surrounded by prickles.

U. Flowers in a dense spike; petals none; calyx segments 4; stamens 2-12; calyx constricted over the fruit.

SANGUISORBA (p. 130)

UU. Flowers not in spikes; petals present; calyx segments rarely 4; stamens often more; calyx not constricted over the fruit.

V. Style terminal.

W. Style jointed to the ovary, deciduous; leaves pinnately compound.

X. Stamens very near the base of the receptacle cup, on a ringlike thickening.

POTENTILLA (p. 129)

XX. Stamens well up on the receptacle cup, ringlike thickening none.

HORKELIA (p. 129)

WW. Style not jointed to the ovary, at least the lower portion persistent; basal leaves mostly lyrate-pinnatifid.

Y. Petals yellow or purplish.

Z. Calyx segments reflexed; styles jointed above the middle, the top deciduous and leaving a hook, not plumose.

GEUM (p. 130)

ZZ. Calyx segments erect or spreading; style not jointed, wholly persistent, hence not hooked, sometimes plumose.

SIEVERSIA (p. 131)

YY. Petals white. U. — (*L. filum* = a thread, *pendulus* = pendulous; said to refer to the roots.)

Filipendula occidentalis

VV. Style lateral.

- a. Petals dark purple; receptacle spongy. W. E. — (Gk. *komaros* = the Arbutus, from the resemblance of the fruits.)

Comarum palustre (PURPLE MARSH-LOCKS)

- aa. Petals yellow or white; receptacle dry.

- b. Leaflets opposite; style attached near the base of the ovary; flowers in cymes; plant without stolons. **DRYMOCALLIS** (p. 130)

- bb. Leaflets not opposite; style attached near the middle of the ovary; flowers solitary; plant with stolons. **ARGENTINA** (p. 129)

PHYSOCARPUS (NINEBARK)

Bark shreddy. Leaves alternate. Calyx segments 5, persistent, stellate-hairy at least inside. Petals white or rarely pinkish. Stamens 20-40. Pistils 1-5; styles terminal. Follicles somewhat united at base. Seeds 2-4. — (Gk. *physa* = a bellows, *carpos* = fruit; from the inflated follicles.)

- A. Carpels usually 5, 8-10 mm. long; shrub 7 m. or less high. W. C. E.

P. capitatus (TALL NINEBARK)

- AA. Carpels usually 1-2, 3-5 mm. long; shrub 2 m. or less high.

- B. Inflorescence bracts lanceolate; follicles inflated. E.

P. monogynus

- BB. Inflorescence bracts spatulate or cuneate; follicles laterally flat. E.

P. malvaceus

SPIRAEA (SPIRAEA)

Leaves evergreen or deciduous; stipules none. Flowers perfect, in racemes or corymbs or panicles. Calyx segments 5. Petals white or red. Stamens 15-70. Pistils 3-8, usually 5, distinct; styles terminal. Seeds 4. — (Gk. *speiran* = to twist; some species have twisted follicles.)

- A. Flowers red.

- B. Inflorescence flat-topped. W. C. E.

S. densiflora (FLAT RED SPIRAEA)

- BB. Inflorescence not flat-topped.

- C. Under side of leaves glabrous.

- D. Twigs villous-puberulent. W. C. E.

S. menziesii

- DD. Twigs glabrous. E.

S. roseata

- CC. Under side of leaves tomentose. W.

S. douglasii (HARDHACK)

- AA. Flowers white.

- E. Inflorescence flat-topped. W. C. E.

S. corymbosa (FLAT WHITE SPIRAEA)

- EE. Inflorescence not flat-topped.

- F. Lower leaf surface tomentose. C.

S. tomentulosa

- FF. Lower leaf surface not tomentose. C. E.

S. pyramidata (PYRAMID BUSH)

PETROPHYTUM

Low, on rocks. Leaves oblanceolate or spatulate, coriaceous, evergreen. Flowers in racemes; racemes rarely compound. Calyx segments 5. Petals white. Stamens about 20. Pistils 3-5; ovary and lower part of style very hairy; style terminal. Seeds 2-4. — (Gk. *petros* = a stone, *phyton* = a plant; referring to their rock habitat.)

- A. Leaves 3-veined.

- B. Sepals obtuse; petals obovate or oval; leaves glabrous or nearly so. W.

P. hendersoni

BB. Sepals acuminate; petals spatulate or oblanceolate; leaves canescent. E.

P. cinerascens

AA. Leaves 1-veined. C. E.

P. caespitosum

HOLODISCUS (OCEAN SPRAY)

Leaves deciduous; stipules none. Flowers in terminal panicles, many. Sepals 5, 3-veined. Petals white or pinkish. Stamens about 20. Akenes long-hairy. — (Gk. *holos* = whole, *diskos* = a disk; the disk of the receptacle is entire-margined.)

A. Leaves acute to truncate at base. W. C. E.

H. discolor

AA. Leaves cuneate at base. U. C.

H. glabrescens

HORKELIA (HORKELIA)

Perennial, with scaly rootstocks or caudices. Leaves pinnately compound. Flowers in cymes or panicles. Calyx segments 5. Petals 5, white or rose or yellow. Stamens 5-20, in the throat of the calyx tube. Filaments filiform or somewhat petal-like. Receptacle flat to conic. Pistils 3 to many; styles long. — (Meaning undetermined.) Species too difficult for beginners.

POTENTILLA (5-FINGER)

Leaves pinnately or digitately or ternately compound. Calyx segments 4-5. Petals 5, obcordate to round, yellow or white or dark purple. Stamens usually 20, in 3 series of 10 + 5 + 5 respectively, near the base of the calyx cup; style near apex of ovary, jointed to it, deciduous. — (Diminutive of *L. potens* = powerful; first applied to *Argentina anserina*, which was thought to be medicinal.) Species too difficult for beginners.

ARGENTINA (SILVERWEED)

Perennial, with long runners. Leaves interrupted-pinnate; leaflets many. Flowers on long peduncles, in the axils of the basal leaves. Calyx segments 5 or more. Petals elliptic to orbicular. Stamens 20-25, in 3 series, near base of calyx. Receptacle hemispheric. Pistils very many; style glabrous. — (*L. argentina* = of silver; from the silvery-hairy leaves.)

A. Leaves silvery on both sides. W. C. E.

A. argentea

AA. Leaves silvery beneath, green above.

B. Stem and petiole and leaf rachis densely hairy. W. E.

A. anserina (GOOSE TANSY)

BB. Stem and petiole and leaf rachis glabrous or slightly appressed-hairy. W.

A. pacifica

FRAGARIA (STRAWBERRY)

Perennial, acaulescent. Leaves ternate. Calyx segments 5. Petals white, obovate to orbicular. Stamens about 20, in 3 series, sometimes abortive, closely surrounding the base of the receptacle. Receptacle hemispheric or obconic, enlarged and red in fruit, very juicy, edible. Akenes

very many; style lateral. — (*L. fragans* = fragrant; from the odor of the fruit.) Fruits edible.

- A. Pubescence of the scapes and petioles spreading, generally at right angles or somewhat reflexed.
- B. Leaves densely silky beneath; akenes in shallow pits.
- C. Terminal leaflet plainly petiolulate; sepals acute or mucronate; often cultivated. W. F. *chiloensis*
- CC. Leaflets all subsessile; sepals acuminate. W. C. E. F. *cuneifolia*
- BB. Leaves slightly silky beneath, glabrate when old.
- D. Leaflets subsessile; akenes not in pits, superficial. W. C. E. F. *americana*
- DD. Leaflets petiolulate; akenes in pits.
- E. Plant more or less glaucous; petals oval or orbicular, twice as long as the sepals.
- F. Sepals and bractlets elliptic. E. F. *truncata*
- FF. Sepals and bractlets lanceolate. E. F. *platypetala*
- EE. Plant not glaucous; petals roundish-obovate, $1\frac{1}{2}$ times as long as the sepals. W. F. *grandiflora*
- AA. Pubescence of the scapes and petioles appressed or ascending; akenes in pits.
- G. Flowers 2–3.5 cm. wide; leaves finely tomentulose beneath. (See C.)
- GG. Flowers 1–2 cm. wide; leaves not tomentulose beneath. E. F. *ovalis*

DRYMOCALLIS

Perennial. Leaves pinnate, glandular. Flowers in cymes. Calyx segments 5. Petals obovate to orbicular, yellow or white. Stamens 20–30, in 5 clusters. Receptacle hemispheric. Pistils many. — (Gk. *drymos* = a brushwood, *kallos* = beauty; from their growth in open woods.) Too difficult for beginners.

SANGUISORBA (BURNET)

Leaves pinnate; leaflets petiolulate; stipules none. Spikes long-peduncled. Calyx segments petal-like. Pistils 1–3; style terminal. — (*L. sanguis* = blood; *sorbere* = to absorb; from reputed styptic properties.)

- A. Leaflets toothed.
- B. Calyx segments white or slightly tinged with purple. W. E. S. *sitchensis*
- BB. Calyx segments dark purple.
- C. Stamens 2–3 times as long as the calyx segments; filaments wide. C. S. *menziesii*
- CC. Stamens hardly if at all longer than the calyx segments; filaments filiform. C. S. *microcephala*
- AA. Leaflets pectinate-pinnatifid. E. S. *annua*

GEUM (AVENS)

Perennial. Leaves mostly basal; basal leaves lyrate or pinnate; stem leaves lobed or compound; stipules adnate. Flowers solitary or in corymbs. Calyx deeply 5-cleft. Stamens many. Receptacle dry, conic or clavate. Pistils many. — (Gk. *geyo* = to taste well; some have edible roots.)

- A.** Leaf segments and their lobes acute; terminal leaflet cuneate-obovate; receptacle downy-pubescent. **E.** **G. strictum** (YELLOW AVENS)
AA. Leaf segments and their lobes obtuse; terminal leaflet broadly cordate; receptacle nearly naked. **W. C. E.** **G. macrophyllum** (LARGE-LEAVED AVENS)

SIEVERSIA

Perennial; stem simple. Leaves mostly basal; basal leaves pinnate. Flowers in terminal cymes. Calyx deeply 5-cleft. Stamens many. Receptacle dry. Pistils many; style straight. — (Honor of J. Sievers, a Russian traveler.)

- A.** Flowers pale purplish; style plumose; plant hairy; stem leaves not pinnatifid. **W. C. E.** **S. ciliata**
AA. Flowers yellow; style glabrous; plant glabrous or nearly so; stem leaves pinnatifid. **E.** **S. rossii**

CERCOCARPUS (MOUNTAIN MAHOGANY)

Shrubs or small trees. Leaves alternate, evergreen; stipules small, wholly adnate. Flowers axillary, solitary. Calyx tube long and pedicel-like; segments 5, short, deciduous. Stamens 15–25, on the calyx. Pistil 1, simple, free, erect; style terminal, villous. Akene linear-oblong, terete, villous. — (Gk. *kerkos* = a tail, *karpos* = a fruit; referring to the long-tailed akenes.)

- A.** Leaves resinous, 1-veined, margin revolute.
B. Shrub; leaves linear, 2–4 cm. long; calyx lobes not half as long as the throat; tails of the akenes 2.5–5 cm. long. **E.** **C. intricatus**
BB. Shrub or small tree; leaves oblong-lanceolate, 4–6 cm. long; calyx lobes as long as the throat; tails of the akenes 5–7.5 cm. long. **E.** **C. ledifolius**
AA. Leaves not resinous, pinnately veined, margin not revolute. **U. E.** **C. parvifolius**

RUBUS (BLACKBERRY, RASPBERRY)

Shrubs or herbs, erect or trailing, often prickly. Leaves simple or pinnately 3–7-foliolate; stipules adnate. Flowers white or purple. Calyx 5-lobed, persistent. Petals conspicuous. Stamens many on the calyx. Carpels few to many, becoming drupelets; style nearly terminal, deciduous. Drupelets usually adhering into a compound berry. — (*L. ruber* = red; from the fruit; hence *L. rubus* = a bramble.) Fruits edible.

- A.** Leaves 3–5-lobed or rarely -parted.
B. Stem erect, 9–24 dm. high; shrub, not prickly; leaves 10–30 cm. long; fruit of many drupelets. **W. C. E.** **R. parviflorus** (THIMBLEBERRY)
BB. Stem trailing, 0.5–12 dm. long; leaves 2.5–7.5 cm. long; fruit of 1–5 drupelets.
C. Vine shrubby, with small recurved prickles; leaves shining, veins and petioles with recurved prickles beneath; carpels glabrous. **W. C. E.** **R. nivalls**
CC. Vine herbaceous, without prickles; leaves not shining, not prickly; carpels tomentose. **W. C.** **R. lasiococcus**
AA. Leaves 3–5-foliolate.
D. Herbaceous vine, trailing, without prickles. **W. C. E.** **R. pedatus**

DD. Shrubs, either trailing vines or more erect plants, prickly.

E. Flowers red; fruit yellow or garnet; spreading bush, not even the longer branches trailing. W. C. *R. spectabilis* (SALMONBERRY)

EE. Flowers white; fruit black; most of the species with the longest branches inclined to trail, or all trailing.

F. Leaves much dissected into 7 to many small segments, evergreen. W. — Sometimes cultivated. *R. laciniatus* (EVERGREEN BLACKBERRY)

FF. Leaves with 3-5 leaflets, not evergreen (except *R. ursinus* west of the Cascades).

G. Trailing vine; carpels not pulling off from the receptacle in fruit (Blackberry). W. C. E. *R. ursinus* (TRAILING BLACKBERRY)

GG. Stems erect or ascending, but the long branches often somewhat trailing; carpels pulling off from the receptacle in fruit (Raspberry).

H. Stems not glaucous; fruit red. E. *R. strigosus* (WILD RED RASPBERRY)

HH. Stems glaucous; fruit black.

I. Leaves glaucous beneath. W. C. E. — Sometimes cultivated.

R. leucodermis (BLACKCAP)

II. Leaves green beneath. E.

R. hesperius

ROSA (ROSE)

Leaves odd-pinnate; stipules adnate. Flowers large. Calyx urn-shaped; the tube contracted at the mouth, at length fleshy or berrylike, inclosing the pistils. Pistils many. Akenes crustaceous or bony. — (Latin name.) Many cultivated varieties.

A. Calyx tube and fruit prickly.

B. Flowers solitary at the ends of short leafy branches; fruit densely spiny. E.

R. macdougalii

BB. Flowers in corymbs; fruit not spiny. U.

R. spithamea

AA. Calyx tube and fruit not prickly.

C. Calyx segments deciduous when fruit is mature; leaflets doubly serrate.

D. Sepals pinnatifid; leaflets densely resinous beneath, aromatic; spines recurved. W. *R. rubiginosa* (SWEETBRIER)

DD. Sepals not pinnatifid; leaflets not resinous beneath, not aromatic; spines straight. W. C. E. *R. gymnocarpa* (NAKED ROSE)

CC. Calyx segments persistent.

E. Infra-stipular spines none. E.

R. sayi (PRICKLY ROSE)

EE. Infra-stipular spines usually present.

F. Flowers solitary; rachis of leaves not prickly nor pubescent. W. C. E.

R. nutkana (NUTKA ROSE)

FF. Flowers in corymbs, rarely solitary; rachis of leaves prickly or pubescent.

W. C.

R. pisocarpa (BUNCHED ROSE)

MALACEAE (APPLE FAMILY)

Trees or shrubs. Leaves alternate, simple or odd-pinnate; stipules caducous, free or nearly so. Flowers perfect, regular, white or reddish, clustered. Calyx segments 5. Petals 5, on the calyx cup. Stamens mostly 20, on the calyx. *Ovary inferior, compound*; carpels 2-5; styles as many as the carpels. *Fruit apple-like.*

- A.** Leaves pinnately compound. **SORBUS** (p. 133)
- AA.** Leaves simple.
- B.** Leaves linear-lanceolate to oblanceolate; plant 1-2 m. high; flowers 1-2 in a cluster. **E.** — (Apparently. *Gk. per* = through, *a* = without, *phyllon* = a leaf; hence through-absence-of-leaves.) **Peraphyllum ramosissimum**
- BB.** Leaves wider; plant usually taller; flower clusters usually larger.
- C.** Smaller branches with stout thorns; flowers in corymbs; fruit with stony carpels. **CRATAEGUS** (p. 134)
- CC.** Plant without thorns; fruit with papery carpels.
- D.** Flowers in corymbs; fruit yellowish green to red, having the appearance of an apple. **PYRUS** (p. 133)
- DD.** Flowers in racemes; fruit black or purplish, having the appearance of a berry. **AMELANCHIER** (p. 133)

SORBUS (MOUNTAIN ASH)

Shrubs or small trees. Leaves odd-pinnate, deciduous. Flowers small, in terminal compound cymes. Carpels 3-5, coriaceous, 1-seeded. Fruit small, globose or pyriform. — (A Latin name for the service tree, *Pyrus domestica*.)

- A.** Leaflets dull, serrate only near the apex; fruit purple, glaucous. **W. C. E.**
S. occidentalis
- AA.** Leaflets shining, serrate from near the base; fruit coral-red. **W. C. E.**
S. sitchensis

PYRUS (APPLE)

Trees, small. Leaves deciduous, more or less serrate, sometimes somewhat 3-lobed in ours. Flowers white to pink. Calyx tube urn-shaped. Styles 5, more or less united at base. Carpels 5, 2-seeded, wholly covered by the adnate calyx tube. Fruit globose or oblong or pyriform, depressed at both ends, acid. — (The Latin name of the pear.)

- A.** Fruit widest between the middle and the stem end, without grit cells.
- B.** Leaves often somewhat 3-lobed, white-pubescent beneath; fruit 8-12 mm. wide, 15-20 mm. long. **W.**
P. rivularis (WILD CRAB APPLE)
- BB.** Leaves not lobed; fruit larger.
- C.** Leaves glabrate; calyx lobes glabrate outside; fruit 3 cm. or less wide. **W. E.**
P. baccata (SIBERIAN CRAB)
- CC.** Leaves white-pubescent beneath; calyx lobes white-pubescent outside; fruit mostly larger. **W. E.** — Many varieties. **P. malus** (CULTIVATED APPLE)
- AA.** Fruit widest between the middle and the flower end, with grit cells. **W. E.** —
P. communis (CULTIVATED PEAR)

AMELANCHIER (SERVICE BERRY)

Shrubs or small trees. Flowers white, in small racemes. Styles 3-5. Carpels 3-5, incompletely 2-celled by a partition from the back, 1-seeded, wholly covered by the adherent calyx. Fruit small, berry-like, black or purplish, edible, sweet. — (The French name for a cultivated Hawthorn.) Fruit edible.

A. Twigs pale or ashy.

B. Leaves cuneate at base. E.

A. cuneata

BB. Leaves rounded at base.

C. Calyx lobes erect. U.

A. pallida

CC. Calyx lobes reflexed. E.

A. utahensis

AA. Twigs not ashy.

D. Leaves tomentose beneath when young.

E. Petals 12-15 mm. long. W. C. E.

A. florida

EE. Petals about 8 mm. long. E.

A. oreophila

DD. Leaves glabrous even when young.

F. Leaves bright green; petals about 2 cm. long. E.

A. cusickii

FF. Leaves whitish green; petals 1-1.5 cm. long. E.

A. basalticola

CRATAEGUS (HAWTHORN)

Shrubs or small trees. Leaves toothed or lobed. Flowers white. Stamens 5-20. Carpels 2-5, 1-seeded. Fruit drupelike, globose or ovoid, crowned with the calyx teeth. — (Gk. *kratos* = strength; referring to the toughness of the wood.)

A. Fruit black; spines 1-3 cm. long.

B. Leaves lobed or incisely and doubly toothed; petiole with scattered glands. W. E.

C. douglasii

BB. Leaves serrate, not incisely toothed or lobed; petiole glandless. E.

C. rivularis

AA. Fruit red; spines 4-6 cm. long.

C. Leaves oval to orbicular. E.

C. sheridana

CC. Leaves cuneate-obovate.

D. Calyx and fruit glabrous. E.

C. columbiana

DD. Calyx and fruit tomentose. E.

C. piperi

AMYGDALACEAE (PEACH FAMILY)

Shrubs or trees. Leaves alternate, simple, petioled; stipules small and caducous, or none. Flowers regular, perfect or imperfect. Calyx tubular or campanulate, deciduous; segments 5. Petals 5, on the calyx. Stamens 15-20, on the calyx. *Pistils* 1-5, *distinct*; *ovary superior*, 1-celled. *Fruit* 1-5 *separate drupes*. Seed 1.

A. Leaves serrate; stipules present but caducous; flowers perfect, not with bad odor; carpel 1; drupe 1.

B. Stone rough; fruit downy.

AMYGDALUS (p. 134)

BB. Stone smooth; fruit glabrous (except in the Apricot).

PRUNUS (p. 135)

AA. Leaves entire or undulate; stipules none; flowers dioecious, with bad odor; carpels 2-5; drupes 2-5. W. C. — (Gk. *osmeres* = smelling; the flowers have an unpleasant odor.)

Osmaronia cerasiformis (INDIAN PLUM)

AMYGDALUS (PEACH)

(The Latin name of the Peach.)

A. Pulp edible; seed not edible. W. E.

A. persica (PEACH)

AA. Pulp not edible, seed edible. W. E.

A. amygdalus (ALMOND)

PRUNUS (PLUM, CHERRY)

Shrubs or trees. Flowers white or pink, clustered. Petals spreading. Style terminal. Fruit glabrous, stone smooth or nearly so, terete or flat. — (Latin name of the plum.) Here belong the following: *P. armeniaca* (Apricot); *P. cerasus* (Pie cherry); *P. avium* (Sweet cherry); *P. domestica* (Cultivated plum), and a variety of the same (Prune).

A. Fruit 15–20 mm. long; stone flat; flowers not in racemes. W. E.

P. subcordata (WILD PLUM)

AA. Fruit 4–10 mm. long; stone subglobose.

B. Flowers in corymbs; fruit bright red; petiole without glands. W. C. E.

P. emarginata (WILD CHERRY)

BB. Flowers in racemes; fruit dark purple; petiole usually with 2 glands just below point of attachment to blade. W. E.

P. demissa (CHOKECHERRY)

LEGUMINACEAE (BEAN FAMILY)

Herbs or shrubs or trees, often vining. Leaves alternate, mostly compound; stipules present. Flowers irregular, *papilionaceous*. Calyx 4–5-toothed or -cleft, sometimes 2-lipped. Petals distinct or *somewhat united*, usually consisting of 1 wide upper one (standard) and 2 lateral ones (wings) and 2 lower usually united ones (keel). Stamens *monadelphous* or *diadelphous* or rarely distinct, 10 or rarely 5. Pistil 1, *simple*; ovary superior, usually 1-celled, sometimes lengthwise 2-celled by the intrusion of the sutures, sometimes crosswise 2- to several-celled; style 1. Fruit a pod, dehiscent by 2 valves or indehiscent, sometimes breaking crosswise into joints. Seeds 1 to many. — Species keys omitted in certain difficult genera. (F. & R. pp. 224–242.)

A. Trees, cultivated; stipules often spiny; leaves pinnately compound. W. E. — Planted for shade. (Honor of J. and V. Robin, who first cultivated the tree in Europe.) Roots, leaves, and bark poisonous. *Robinia pseudacacia* (LOCUST)

AA. Shrubs.

B. Plant spiny; leaves simple, often becoming spines; branches not or hardly 4-angled, not conspicuously green. W. — (The Latin name.)

Ulex europaeus (GORSE)

BB. Plant not spiny; leaves with 1–3 leaflets, not becoming spines; branches conspicuously 4-angled, dark green. W. E. — Ornamental shrub; escaped. (From Cythras, one of the Cyclades, where this or a related plant was first found.)

Cytisus scoparius (SCOTCH BROOM)

AAA. Herbs, or somewhat shrubby at base.

C. Leaves with 3 leaflets.

D. Stamens distinct; stipules free; leaflets entire; flowers yellow, in terminal 3-bracted racemes.

THERMOPSIS (p. 137)

- DD.** Stamens either monadelphous or diadelphous in groups of 9 and 1; stipules often adnate; leaflets serrate in most species; flowers not yellow in most, often in heads.
- E.** Flowers in heads or headlike umbels.
- F.** Leaflets entire; mature pod about 2.5 cm. long. **LOTUS** (p. 140)
- FF.** Leaflets denticulate; mature pods 1 cm. or less long. **TRIFOLIUM** (p. 138)
- EE.** Flowers in spikes or racemes, rarely in heads and then the pod coiled and the leaflets denticulate.
- G.** Leaflets not entire.
- H.** Flowers in spikes or heads, yellow or purple; pod curved or coiled, often spiny. **MEDICAGO** (p. 137)
- HH.** Flowers in long racemes, yellow or white; pod straight, wrinkled. **MELILOTUS** (p. 137)
- GG.** Leaflets entire.
- I.** Leaves punctate with dark glands or pellucid dots; pod 6 mm. long; seed 1. **PSORALEA** (p. 140)
- II.** Leaves not punctate; pod 12 mm. or more long; seeds 2 to many. **ASTRAGALUS** (p. 141)
- CC.** Leaves palmately compound, with 5-16 leaflets, occasionally some leaves with only 3 leaflets.
- J.** Leaflets coarsely serrate or dentate. **TRIFOLIUM** (p. 138)
- JJ.** Leaflets entire.
- K.** Leaflets 5-16, not punctate, often quite hairy; keel of the corolla acuminate; seeds 1 or more. **LUPINUS** (p. 137)
- KK.** Leaflets 3-7, punctate with dark glands or pellucid dots, glabrous or with few hairs; keel of the corolla obtuse; seed 1. **PSORALEA** (p. 140)
- CCC.** Leaves pinnately compound, with 4 or more leaflets or occasionally some leaves with fewer.
- L.** Leaves with an odd leaflet at the tip, without tendrils.
- M.** Herbage conspicuously glandular-dotted.
- N.** Leaflets 5-9, narrowly oblong to obovate, 1-12 cm. long; peduncles much exceeding the leaves, terminal; flowers deep purple; stamens 5; pod not prickly, 1-seeded. *E.* — (Gk. *petalon* = a petal, *stemon* = a stamen; from the union of the two in the flower.) **Petalostemon ornatus** (PRAIRIE CLOVER)
- NN.** Leaflets 13-17, oblong to oblong-lanceolate, 2.5-5 cm. long; peduncles about equaling the leaves, axillary; flowers ochroleucous; stamens 10; pod prickly with hooked prickles, 2-6-seeded. *E.* — *Glycyrrhiza alba* is the source of commercial licorice. (Gk. *glykys* = sweet, *rhiza* = a root; the root is sweet.) **Glycyrrhiza lepidota** (WILD LICORICE)
- MM.** Herbage not glandular-dotted; stamens 10; pod not prickly.
- O.** Flowers solitary or in umbels; pod linear, not jointed; leaflets 3-15. **LOTUS** (p. 140)
- OO.** Flowers in spikes or racemes, rarely solitary and then the pod not linear; leaflets often more numerous.
- P.** Pod 2-4-jointed, reticulate. **HEDYSARUM** (p. 141)
- PP.** Pod not jointed, often veiny but hardly reticulate.
- Q.** Keel of the corolla acute or subulate at apex. **ARAGALLUS** (p. 141)
- QQ.** Keel of the corolla obtuse at apex. **ASTRAGALUS** (p. 141)

LL. Leaves without an odd leaflet at the tip but often with tendrils.

R. Style terete above, with a tuft of hairs at tip. VICIA (p. 141)

RR. Style somewhat flat above, with hairs down the concave side for a short distance from the tip. LATHYRUS (p. 142)

THERMOPSIS

Perennial, stout, erect. Leaflets petiolulate; stipules foliaceous; bracts of the raceme herbaceous, persistent. Calyx 4-5-cleft. Standard roundish, shorter than the wings; wings oblong; keel obtuse, equaling the wings. Stamens 10. Pod narrow, flattish. — (Gk. *thermos* = the lupine, *opsis* = like.)

A. Two upper calyx lobes united into a 2-toothed segment.

B. Racemes short, loosely flowered; bracts acute; calyx teeth acute. U. T. *gracilis*

BB. Racemes long, densely flowered; bracts acuminate; calyx teeth acuminate. U. T. *robusta*

AA. Two upper calyx lobes united only about as much as the others.

C. Leaflets oblong-oblancoate to obovate; plant with somewhat fleshy rootstock. W. E. T. *montana*

CC. Leaflets oval to narrowly elliptic; plant with woody caudex and roots. E. T. *xylorhiza*

LUPINUS (LUPINE)

Flowers in terminal racemes or spikes, mostly showy. Calyx deeply 2-lipped; upper lip 2-cleft or -toothed or rarely entire; lower lip entire or 3-toothed. Wings united at the summit; keel falcate. Stamens monadelphous; alternate filaments longer. Stigma bearded. Pod coriaceous. — (L. *lupus* = a wolf; it was supposed to devour that which made the soil fertile.) Species too difficult.

MEDICAGO (MEDIC)

Leaves small. Flowers small, in axillary heads or spikes. Calyx teeth nearly equal. Standard obovate or oblong; wings oblong; keel obtuse. Stamens 10, diadelphous, in groups of 1 and 9. Pod indehiscent. Seeds 1 to few. — (Gk. *medike* = the Alfalfa; because the Greeks got this from Media.)

A. Perennial, 5-12 dm. high; flowers violet, in spikes about 6 cm. long. W. E. — One of our best hay plants. M. *sativa* (ALFALFA)

AA. Annual, 1.5-6 dm. high; flowers yellow, in heads about 2 cm. long.

B. Pod several-seeded, spiral, spiny on the edges. W. E.

M. *denticulata* (BUR CLOVER)

BB. Pod 1-seeded, curved, not spiny. W. E.

M. *lupulina* (NONESUCH)

MELILOTUS (MELILOT)

Annual or biennial. Leaves petioled. Flowers small. Calyx teeth nearly equal. Standard obovate or oblong; wings oblong; keel obtuse. Stamens 10, diadelphous, in groups of 9 and 1. Pod ovoid or globose, in-

dehiscent or finally 2-valved. Seeds 1 to few. — (Gk. *mel* = honey, *lotos* = some plant of this family; the flowers are prolific in honey.)

- A. Flowers white. E. — A roadside weed. Good for hay or browse.
M. alba (SWEET CLOVER)
- AA. Flowers yellow.
 B. Leaflets obtuse, toothed from near the base; petals 6–9 mm. long. E.
M. officinalis (YELLOW MELILOT)
- BB. Leaflets truncate or emarginate, toothed above the middle; petals 2–2.5 mm. long. E.
M. indica (SMALL MELILOT)

TRIFOLIUM (CLOVER)

Leaves normally 3-foliolate, in a few species 5–7-foliolate; stipules adnate to the petiole. Flowers variously colored. Calyx teeth nearly equal. Petal claws adhering to the stamen tube. Stamens diadelphous in groups of 9 and 1, or monadelphous by only the partial separation of the 1. Seeds 1–6. — (L. *tres* = 3, *folium* = a leaf.) All those large enough are good hay or fodder plants.

- A. Leaflets 3–7, but always some leaves with 5–7; heads without involucre.
 B. Leaflets 5–7; flowers 2–3 cm. long. E.
T. macrocephalum (LONG-FLOWERED CLOVER)
- BB. Leaflets 3–5; flowers 6–8 mm. long. E.
T. plummerae
- AA. Leaflets 3, except in occasional abnormal leaves.
 C. Heads not subtended by an involucre.
 D. Heads on terminal peduncles; plants sometimes stemless.
 E. Leaves glabrous.
 F. Calyx teeth 3 times as long as the tube. E.
T. douglasii
- FF. Calyx teeth scarcely longer than the tube.
 G. Stem quite evident.
 H. Stem stout; heads globose; leaflets mostly obtuse; flowers 12–20 mm. long. E.
T. beckwithii
- HH. Stem slender; heads oblong; leaflets mostly acuminate; flowers 8–14 mm. long. C. E.
T. latifolium
- GG. Stemless or nearly so. E.
T. haydeni
- EE. Leaves pubescent.
 I. Corolla pink or red or purple.
 J. Perennial; calyx lobes not plumose, shorter than the corolla.
 K. Stems 3–9 dm. high; leaflets 2.5–5 cm. long; flowers purplish red, not reflexed; stipules acuminate. W. C. E.
T. pratense (RED CLOVER)
- KK. Stems 1.5–2 dm. high; leaflets 1.2–2.5 cm. long; flowers pinkish or light red, at length reflexed; stipules acute. U.
T. oreganum
- JJ. Annual; calyx lobes plumose, equaling or exceeding the corolla.
 L. Leaflets 4–12 mm. long; heads ovate; flowers dark purple. W.
T. albopurpureum
- LL. Leaflets 12–25 mm. long; heads oblong; flowers pinkish. W. E.
T. arvense (RABBIT-FOOT CLOVER)
- II. Corolla yellow or white.
 M. Heads ovoid or oblong; flowers at length reflexed. E.
T. plumosum
- MM. Heads obovate. W. C. E.
T. longipes
- MMM. Heads globose.
 N. Calyx teeth plumose.

- O. Lobes of the calyx about equal, 3-4 times as long as the calyx tube. W.
T. eriocephalum
- OO. Lobes of the calyx unequal, one twice as long as the other and as the calyx tube. E.
T. arcuatum
- NN. Calyx teeth hairy but not plumose.
P. Flowers with pedicels. C. E.
T. latifolium
- PP. Flowers nearly sessile. E.
T. covillei
- DD. Heads on axillary peduncles; plants not stemless.
Q. Flowers yellow.
R. Heads 3-15-flowered; standard faintly striate. W. C.
T. dubium (SMALL HOP-CLOVER)
- RR. Heads 20-40-flowered; standard distinctly striate. W.
T. procumbens (LARGE HOP-CLOVER)
- QQ. Flowers white or pinkish.
S. Calyx and its lobes $\frac{1}{2}$ shorter than the corolla; perennials.
T. Leaflets 0.6-2.5 cm. long; heads ovate or oblong, many-flowered. U.
T. howellii
- TT. Leaflets 0.6-1.2 cm. long; heads 5-10-flowered.
U. Stipules oval. E.
T. gymnocarpon
- UU. Stipules lanceolate. U.
T. depauperatum
- TTT. Leaflets 2.5-7.5 cm. long; heads globose, many-flowered.
V. Leaflets obtuse, rarely emarginate; erect or ascending, not stoloniferous; stem not rooting at the joints; flowers pinkish; calyx teeth about equal. W. E.
T. hybridum (ALSIKE CLOVER)
- VV. Leaflets obcordate to retuse; prostrate with the tip ascending, stoloniferous; stem rooting at the joints; flowers white; calyx teeth very unequal. W. C. E.
T. repens (WHITE CLOVER)
- VVV. Leaflets mostly retuse; prostrate; flowers white or pinkish; calyx teeth about equal. U.
T. breweri
- SS. Calyx lobes from almost equaling to exceeding the corolla; annuals.
W. Calyx teeth scarious-margined, ciliate. W. E.
T. ciliolatum
- WW. Calyx teeth not scarious-margined, not ciliate.
X. Leaflets notched at apex. W. E.
T. hallii
- XX. Leaflets not notched at apex. W.
T. gracilentum
- CC. Heads subtended by an involucre.
Y. Corolla yellow; standard conspicuously enlarged. W.
T. flavulum
- YY. Corolla ochroleucous; standard conspicuously enlarged. W.
T. furcatum
- YYY. Corolla not yellow nor ochroleucous; standard not conspicuously enlarged (except in *T. depauperatum*).
Z. Involucre membranous at least at base, not deeply lobed, the lobes entire or toothed; flowers white or light pink.
a. Plant glabrous.
b. Involucre none or entire, with no segments; leaflets 6-12 mm. long; standard much enlarged; calyx teeth not branched. U.
T. depauperatum
- bb. Involucre with 7-10 shallow lobes, the lobes spinulose-dentate; leaflets 12-25 mm. long; standard not much enlarged; calyx teeth branched. E.
T. cyathiferum
- aa. Plant villous; calyx teeth scarious-margined.
c. Involucre merely basal, its lobes laciniately toothed; calyx glabrous. W. C.
T. microdon
- cc. Involucre nearly inclosing the head, its lobes entire; calyx hairy. W. E.
T. microcephalum
- ZZ. Involucre not membranous, deeply lobed, the lobes laciniately and sharply toothed; flowers dark lilac-purple.
d. Plant perennial with creeping rhizomes. W. E.
T. fimbriatum

dd. Plant annual.

e. Leaflets obovate or obcordate, 0.6-1.2 cm. long; heads 1-1.4 cm. wide.
W. C. E. T. variegatum

ee. Leaflets linear or oblong or lanceolate.

f. Leaflets 1.6-2 cm. long, obtuse or emarginate; heads 5-7-flowered, 1-1.5 cm. wide; calyx lobes never 3-toothed. W. T. oliganthum

ff. Leaflets 2.5-5 cm. long, obtuse or acute; heads more than 7-flowered, 2-3 cm. wide; calyx lobes sometimes 3-toothed. W. T. tridentatum

LOTUS (BIRD-FOOT TREFOIL)

Annual or perennial. Leaves 3-15-foliolate, ternate or pinnate; leaflets entire. Flowers 1 to several in a leaf axil. Calyx 5-toothed or -cleft; teeth nearly equal. Petals free from the stamens, nearly equal. Stamens diadelphous, in groups of 9 and 1. Pods linear, flattish or terete, with spongy partition between the seeds. Seeds 1 to several. — (A Greek name for some plants of this family.)

A. Annual; flowers solitary (sometimes 2 on a peduncle in *L. parviflora*).

B. Flowers and pods nearly sessile.

C. Stem glabrous, 3-6 dm. high, erect, sparingly branched; corolla pale yellow to dark red. W. E. L. denticulatus

CC. Stem pilose or villous, 1-1.5 dm. high, diffusely branched from the base; corolla bright yellow. U. L. wrangelianus

BB. Flowers and pods with peduncles nearly as long as the leaves, or longer.

D. Leaflets lanceolate to ovate, usually villous; flowers 5-6 mm. long; bract at top of peduncle 1-3-foliolate. W. E. L. americanus (SPANISH CLOVER)

DD. Leaflets oblong to ovate, usually glabrous; flowers 3-4 mm. long; bract at top of peduncle 1-3-foliolate. E. L. parviflorus

AA. Perennial; flowers in umbels.

E. Leaflets 3-9; flowers various, but with some yellow in them.

F. Leaves pubescent; flowers 4-13 mm. long.

G. Stem procumbent or ascending, villous or tomentose; leaflets mostly acute, 6-12 mm. long; pod 1-2-seeded, its beak not hooked. W. E. L. decumbens

GG. Stems erect or ascending, finely pubescent; leaflets mostly obtuse, 13-25 mm. long; pod 5 or more seeded, its beak hooked. U. L. torreyi

FF. Leaves glabrous or nearly so; flowers 14-20 mm. long.

H. Flowers pure yellow. E.

L. macbridei

HH. Flowers with yellow standard but white or purple wings.

I. Peduncles usually without a bract; corolla with yellow standard and white wings. W. E. L. bicolor

II. Peduncles with a bract at the umbel; corolla with yellow standard and purple wings. W. L. gracilis

EE. Leaflets 9-15; flowers purple. W. E.

L. crassifolius

PSORALEA (PSORALEA)

Perennial. Leaves 3-7-foliolate, punctate with dark glands or pellucid dots; stipules wide. Flowers blue or pink or white. Stamens monadelphous or diadelphous. Pod ovoid, short, indehiscent. Seed 1. — (Gk. *psoraleos* = scurfy; referring to the glands or dots on the leaves.)

A. Leaflets broadly ovate; seed grayish. W. E.

P. physodes

AA. Leaflets lanceolate; seed light brown. E.

P. lanceolata

ASTRAGALUS (RATTLEWEED)

Erect to prostrate. Leaves odd-pinnate; leaflets entire; tendrils none; stipules persistent. Flowers small, narrow. Calyx 5-toothed. Petals with slender claws; keel obtuse. Stamens diadelphous. — (The Greek name of some plant of the family.) Too difficult for the beginner.

ARAGALLUS (LOCO WEED)

Perennial or annual. Leaves odd-pinnate; leaflets entire. Flowers various in color, in spikes or heads; flower clusters axillary or basal. Calyx 5-toothed. Pod partly 2-celled by the intrusion of the ventral (placental) suture. — (Meaning undetermined.) Poisonous to cattle. Too difficult for beginners.

HEDYSARUM

Leaflets entire; stipules scarious. Flowers white or yellow or purplish, racemes axillary, bracted; bracts scarious or setaceous. Calyx 5-toothed or -parted. Stamens hypogynous, diadelphous. Pod flat; joints roundish. — (Gk. *hedys* = sweet, *aroma* = smell; apparently from the fragrant flowers of some.)

- | | | |
|--|-------|-------------------------|
| A. Flowers cream-colored. | E. | H. sulphurescens |
| AA. Flowers light purple. | | |
| B. Stems and leaves canescent. | E. | H. cinerascens |
| BB. Stems and leaves green, glabrate or nearly so. | W. E. | H. boreale |

VICIA (VETCH)

Climbing or trailing or quite weak. Leaves tendril-bearing. Flowers axillary, solitary or in racemes. Calyx tube oblique. Corolla blue or violet or white or yellow. Stamens diadelphous in groups of 9 and 1, or monadelphous below. Pod flat. — (Gk. *bikion* and L. *vicia* = the names of these plants.) Relished by stock.

- | | |
|---|---|
| A. Flowers in spikes or racemes on axillary peduncles. | |
| B. Leaflets 20-30, 2.5-5 cm. long; flowers ochroleucous or tawny; perennial. | |
| W. C. E. | V. gigantia (GIANT VETCH) |
| BB. Leaflets either fewer or less than 2.5 cm. long; flowers from white to purple. | |
| C. Flowers bluish white, 4 mm. or less long; peduncles 2-6-flowered; annual; leaflets 12-14; pod hairy. | W. V. hirsuta (HAIRY VETCH) |
| CC. Flowers deep blue, 5-18 mm. long; perennial. | |
| D. Leaflets 18-24; peduncles densely 15-40-flowered; pod glabrous. | W. V. cracca (TUFTED VETCH) |
| DD. Leaflets 8-16; peduncles loosely 5-16-flowered. | |
| E. Plant glabrous or not villous if hairy, 3-12 dm. high; pod glabrous; leaflets 12-25 mm. long. | |
| F. Leaves ovate-lanceolate to broadly oval. | W. C. E. V. americana (COMMON VETCH) |
| FF. Leaves narrowly linear to oblong. | W. C. E. V. linearis (NARROW-LEAVED VETCH) |

- EE. Plant villous-pubescent; 1.5-3 dm. high; pod pubescent; leaflets 4-14 mm. long. W. C. *V. californica*
- AA. Flowers solitary or in 2's in the axils of the leaves, nearly sessile; annuals.
- G. Flowers white or purplish, 6 mm. long; pod 1.6-2.5 cm. long. U. C. *V. exigua*
- GG. Flowers purple, 12-25 mm. long; pod 2.5-7.5 cm. long.
- H. Leaflets oblong to ovate; pod brown; flowers 18-25 mm. long. W. C. —
Sown for hay. *V. sativa* (SPRING VETCH)
- HH. Leaflets linear to linear-oblong; pod black; flowers 12-16 mm. long. W. *V. angustifolia* (COMMON VETCH)

LATHYRUS (PEA)

Erect to vining. Leaves mostly with tendrils. Flowers axillary, solitary or in racemes. Calyx oblique or gibbous at base. Corolla tawny or white to purplish. Stamens diadelphous in groups of 9 and 1, or monadelphous below. Ovules usually many. Pod flat or terete. — (Gk. *lathyros* = the name of some plant of this family.) Relished by stock.

- A. Plant densely silky-villous; rachis of leaves without tendrils. W. *L. littoralis* (SHAGGY PEA)
- AA. Plant not villous, either glabrous or pubescent; rachis of leaves mostly with tendrils or their rudiments.
- B. Flowers purple or whitish.
- C. Stipules narrow, half-sagittate, their lobes usually lanceolate and acuminate; plants glabrous or pubescent.
- D. Leaflets 6-14 mm. long, pubescent.
- E. Peduncles 1-2-flowered; stem very slender. W. *L. torreyi* (1-FLOWERED PEA)
- EE. Peduncles 4-6-flowered; stem rigid. W. *L. vestitus*
- DD. Leaflets 15-25 mm. or more long, glabrous or hairy.
- F. Leaflets 2-4, 2.5-8.7 cm. long; peduncles 2-flowered; flowers purplish. E. *L. bijugatus*
- FF. Leaflets 4-6 or more, often shorter; either peduncles with 3 or more flowers, or else flowers white.
- G. Flowers white.
- H. Leaflets 1.4-2 cm. long. E. *L. rigidus*
- HH. Leaflets 2.5-7.5 cm. long.
- I. Leaflets linear to linear-lanceolate. E. *L. cusickii*
- II. Leaflets ovate to ovate-oblong. E. *L. obovatus*
- GG. Flowers purple.
- J. Stem wingless, although sometimes angular.
- K. Flowers 25 mm. or more long, 3-5 on a peduncle. E. *L. decaphyllus* (PRAIRIE PEA)
- KK. Flowers 10-20 mm. long, often more than 5 on a peduncle.
- L. Plant glabrous throughout or merely minutely papillose.
- M. Peduncles about equaling the leaves; leaves not thick nor coriaceous. U. *L. bolanderi*
- MM. Peduncles much shorter than the leaves; leaves thick-coriaceous. W. E. *L. coriaceous*
- LL. Plant pubescent.
- N. Leaflets lanceolate, pubescent on both sides, obtuse. E. *L. oregonensis*
- NN. Leaflets oblong to ovate, pubescent beneath, glabrous above, acute. W. C. E. *L. nuttallii*

- JJ. Stem winged. W. E. *L. palustris* (MARSH PEA)
 CC. Stipules wide, ovate or somewhat half-hastate; their lobes wider than lanceolate, acute or acuminate; plant glabrous throughout.
 O. Leaflets 10-20, peduncles shorter than the leaves; leaflets not cuspidate; stipules acuminate. W. C. *L. polyphyllus* (MANY-LEAVED PEA)
 OO. Leaflets 6-12.
 P. Leaflets elliptic to linear, cuspidate; stipules acuminate; peduncles exceeding the leaves. E. *L. pauciflorus*
 PP. Leaflets ovate-oblong, not cuspidate; stipules acute; peduncles not exceeding the leaves. W. *L. maritimus* (BEACH PEA)
 BB. Flowers ochroleucous. W. E. *L. ochroleucus* (CREAM-COLORED PEA)

GERANIACEAE (GERANIUM FAMILY)

Herbs. Leaves toothed to compound. Flowers perfect, regular or irregular, on axillary peduncles. Sepals 5. Petals 5. Stamens 5 or 10; filaments either dilated or monadelphous at base. Ovary superior; carpels 5, united around a central axis; ovules 2 in each cell. Capsule 5-lobed; *carpels separating at maturity from the long-beaked central axis from below up; styles forming long carpel tails* which become revolute or spirally twisted.

- A. Leaves palmately-compound or -lobed or -veined. GERANIUM (p. 143)
 AA. Leaves pinnately-compound or -lobed or -veined. ERODIUM (p. 143)

GERANIUM (GERANIUM)

Leaves simple, alternate, usually lobed to deeply dissected; stipules conspicuous. Peduncles 1-3-flowered; pedicels with 4-bracted involucre at base. Sepals persistent. Stamens 5, or 5 longer and 5 shorter. Style 1, split and curled at maturity; stigmas 5. Seed 1 in each cell. — (Gk. *geranos* = a crane; referring to the cranelike beak of the pod.)

- A. Annual; petals 1 cm. or less long.
 B. Plants single or scarcely tufted. W. E. *G. viscosissimum* (STICKY GERANIUM)
 BB. Plants caespitose-tufted. E. *G. fremontii*
 AA. Perennial; petals 1.5-2 cm. long.
 C. Sepals awn-pointed; seeds reticulate or pitted.
 D. Flowers pale purple; seeds minutely reticulate. W. C. E. *G. carolinianum*
 DD. Flowers deep purple; seeds deeply pitted. W. *G. dissectum* (SPLIT-LEAF GERANIUM)
 CC. Sepals awnless; seeds smooth or striate.
 E. Anther-bearing stamens 10; ovary glabrous, transversely rugose. W. *G. molle* (DOVE'S-FOOT GERANIUM)
 EE. Anther-bearing stamens 5; ovary pubescent, not rugose. W. E. *G. pusillum* (SMALL GERANIUM)

ERODIUM (HERON'S-BILL)

Leaves opposite or alternate, simple or compound; stipules present. Flowers in axillary umbels, nearly regular. Upper 2 petals slightly smaller.

Anther-bearing stamens 5, alternate with 5 sterile filaments. Stigmas 5. Styles coiled spirally at maturity. Seed 1 in each lobe. — (Gk. *erodios* = a heron; referring to the long beak of the pod.) The fruits bore into the wool and skin of sheep.

A. Leaves round-reniform to triangular-ovate, crenately dentate. U. *E. macrophyllum*

AA. Leaves pinnately compound or pinnatifid.

B. Leaflets unequally and doubly serrate; sepals not bristle-tipped; plant with a musk odor; anther-bearing filaments 2-toothed. U. *E. moschatum*

BB. Leaves laciniately pinnatifid into narrow acute lobes; sepals bristle-tipped; plant without musk odor; filaments not toothed. W. E. *E. cicutarium*

OXALIDACEAE (WOOD-SORREL FAMILY)

Herbs, annual or perennial, with rhizomes; *sap sour*. Leaves with 3 obcordate leaflets. Flowers perfect, solitary or clustered. Sepals 5. Petals 5, variously colored. Stamens 10. Ovary superior, 5-celled, 5-lobed; styles distinct; ovules 2 to many in each cell. Fruit a capsule, loculicidal, globose or columnar. — Only the following genus.

OXALIS (WOOD SORREL)

Stamens monadelphous at base, 5 longer and 5 shorter, all anther-bearing. — (Gk. *oxus* = sour; from the taste of the herbage.)

A. Flowers yellow; stem erect, 1-3 dm. high. W.

O. pumila (YELLOW WOOD SORREL)

AA. Flowers white or pinkish; stem none; leaves and scapes from horizontal rhizomes.

B. Scapes 1-flowered, shorter than the leaves; petals 16-25 mm. long; capsule ovoid, 1 cm. long. W. C. *O. oregana*

BB. Scapes about 6-flowered, as long as the leaves; petals 6-12 mm. long; capsule linear, 2-3 cm. long. W. C. *O. trillifolia*

LINACEAE (FLAX FAMILY)

Herbs. Leaves alternate or opposite; stipules small or none. Flowers perfect, regular. Sepals 5; persistent. Petals 5. Stamens 5, alternate with the petals; *filaments monadelphous at base; anthers versatile*. Styles 2-5. Fruit a capsule. Seeds 1-2 in each cell, *oily*. — Only the following genus.

LINUM (FLAX)

Leaves sessile. Flowers clustered. Ovary 4-5-celled, or 8-10-celled by false partitions. — (Gk. *linon* = a thread; L. *linum* = the flax plant; because cloth is made from the bast fibers.)

A. Flowers white or pinkish or blue; leaves alternate, all entire.

B. Petals blue, rarely white, 10-20 mm. long; leaves linear to lanceolate or oval.

- C. Perennial; petals 14-20 mm. long; stigma short, but little longer than wide; capsule much exceeding the calyx. E. *L. lewisii*
- CC. Annual; petals about 10 mm. long; stigma long, much longer than wide; capsule about as long as the calyx. W. E. — The seeds furnish linseed oil; the stem is the source of linen. *L. usitatissimum* (CULTIVATED FLAX)
- BB. Petals white or rarely pinkish, never blue, 2-5 mm. long; leaves oblong-spatulate; annual. W. *L. micranthum* (WHITE FLAX)
- AA. Flowers yellow; petals about 2 mm. long; plant annual; leaves mostly opposite, upper ones serrate, elliptic-spatulate. E. *L. digynum* (YELLOW FLAX)

POLYGALACEAE (MILKWORT FAMILY)

Herbs. Leaves alternate, simple, entire. Stipules none. Flowers in racemes, perfect, irregular. *Sepals* 5, *very unequal, the lateral ones(wings) larger, colored*. Petals 3, hypogynous, more or less united into a split tube. *Stamens* 6 or 8, *monadelphous or diadelphous; the tube split and adhering to the petals*. Capsule 2-celled, loculicidal; cells 1-seeded. Seed hairy. — (Gk. *polys* = much; *gala* = milk; the name of some Greek plant used to increase the flow of milk.) U. *Polygala californica* (MILKWORT)

EUPHORBIACEAE (SPURGE FAMILY)

Herbs; *juice often milky*. Flowers monoecious or dioecious, variously arranged, *mostly naked, or with normal calyx present*, or a mere scale; in *Euphorbia* subtended by an involucre resembling a calyx. Stamens 1 to many. Styles 1-3, simple to many-cleft. Fruit a capsule, 2-3-celled, dehiscent; cells 1-2-seeded.

- A. Flowers involucrate: stamens usually 1; both staminate and pistillate flowers with only a rudimentary calyx, or none at all; capsule 3-celled; cells each with 1 or more seeds. *EUPHORBIA* (p. 145)
- AA. Flowers not involucrate; stamens 6-7; staminate flowers with a 5-6-parted calyx; pistillate flowers naked; capsule 1-celled, 1-seeded. E. — (*L. piscaria* = belonging to fish; the Indian stupefied fish by throwing the herbage into the water.) *Piscaria setigera* (TURKEY MULLEIN)

EUPHORBIA (SPURGE)

Leaves alternate or opposite or whorled. Flowers small, naked; involucre top-shaped or campanulate. Staminate flowers many, of 1 naked stamen jointed upon a short pedicel which usually has a minute bract at the base. Pistillate flowers solitary, pedicelled, soon exerted. Styles 3, usually 2-cleft. — (Honor of Euphorbus, the physician to King Juba.)

- A. Stems prostrate-spreading or nearly so; involucre glands bearing petal-like appendages.

A. Sepals 4-5; petals 4-5; stamens 10; stigmas 4-5. — (Gk. *limme* = a lake; *anthos* = a flower; from the common lake-shore habitat.) (F. & R. p. 247.)

Limnanthes

AA. Sepals 2-3; petals 2-3; stamens 6; stigmas 1-3. — (Honor of G. H. Flerke, a German botanist.) *Floerkea proserpinacoides* (FALSE MERMAID)

ANACARDIACEAE (SUMAC FAMILY)

Shrubs; juice resinous or milky. Leaves alternate, 3-foliolate or odd-pinnate. Flowers mainly regular, perfect or polygamodioecious. Calyx 3-7-cleft or -parted. Petals as many as the sepals, or rarely none. Stamens 5. Ovary in the staminate flowers 1-celled; ovary in the pistillate flowers 1-celled; styles 3; cells 1-ovuled. *Fruit a small drupe.* Only the following genus.

RHUS (SUMAC)

Stipules none. Flowers in axillary or terminal clusters. — (Celtic *rhudd* = red; hence Gk. *rhus* = these plants, on account of the red fruit.)

A. Leaflets 11-31; fruit red, pubescent. E. *R. glabra* (SMOOTH SUMAC)

AA. Leaflets 3; fruit white or red, glabrous.

B. Plant with unpleasant odor; flowers in spikes or heads; fruit red. W. C. E.

R. trilobata (SKUNK BUSH)

BB. Plant without unpleasant odor; flowers in panicles; fruit white, smooth or striate.

C. Leaflets mostly subentire, the lateral ones petioled. E. — Poisonous to touch.

R. toxicodendron (POISON IVY)

CC. Leaflets mostly crenate, the lateral ones sessile. W. — Poisonous to touch.

R. diversiloba (POISON OAK)

CELASTRACEAE (STAFF-TREE FAMILY)

Shrubs. Leaves simple; *stipules none or small.* Flowers regular, *small.* Calyx 4-5-lobed or -parted, persistent. Petals 4-5. Stamens alternate with the petals. Ovary free or united with the disk, 1-5-celled; *styles short, thick;* stigma entire or 2-5-lobed; cells 2-4-ovuled. *Fruit a capsule or follicle.*

A. Leaves opposite, ovate to lanceolate, serrulate; branches not spiny; stamens 4 or 5.

B. Shrub 1 m. or less high; leaves evergreen, 1.2-2.5 cm. long; flower parts in 4's; ovary 2-celled. W. C. E. — (Gk. *pachis* = thick; + stigma.)

Pachistima myrsinites

BB. Shrub 2-5 m. high; leaves deciduous, 5-10 cm. long; flower parts in 5's; ovary 3-5-celled. W. C. — (Gk. *eu* = good, *onoma* = name; applied in irony, since it was thought to poison cattle.) *Euonymus occidentalis* (WESTERN WAHOO)

AA. Leaves alternate, deciduous, oblanceolate, entire; branches spiny; stamens 10; flower parts in 5's. E. — (Meaning undetermined.) *Forsellesia spinescens*

ACERACEAE (MAPLE FAMILY)

Shrubs or trees; sap often sweet. Leaves opposite, simple or compound, palmately lobed or rarely pinnate. Flowers polygamous or dioecious, regular, cymose or racemose, axillary or terminal. Calyx usually 5-parted. Petals none or 5. Disk present or none. Stamens 3-12. Styles 2. Carpels 2, united at base, winged, indehiscent. Seeds 1 in each carpel. — Many eastern species cultivated for shade.* Only the following genus.

ACER (MAPLE)

(Celtic *ac* = hard or sharp; hence *L. acer* = these plants; since their hard wood was prized for making weapons.) Maple sugar is derived from *A. saccharinum* of the east.

A. Leaves simple or 3-foliolate; disk present.

B. Leaves 7-9-lobed, 7.5-13 cm. wide; flowers in corymbs; fruit glabrous; mature carpels spreading at about 180°, 2-3.2 cm. long. W. C. E.

A. *circinatum* (VINE MAPLE)

BB. Leaves 5-7-lobed, 15-37 cm. wide; flowers in racemes; fruit hispid; mature carpels spreading at about 90° or less, 3.7-5 cm. long. W. C. E. — Our finest native shade tree.

A. *macrophyllum* (LARGE-LEAVED MAPLE)

BBB. Leaves 3-5-lobed or 3-foliolate, 2.5-7.5 cm. wide; flowers in corymbs; fruit glabrous; mature carpels spreading at about 90° or less, 2-3 cm. long. W. C. E.

A. *glabrum* (ROCKY MOUNTAIN MAPLE)

AA. Leaves 3-9-foliolate; disk none. W. E. — Often planted for shade.

A. *negundo* (BOX ELDER)

BALSAMINACEAE (TOUCH-ME-NOT FAMILY)

Herbs, annual, glabrous, succulent. Leaves alternate, thin, simple, dentate, petioled. *Flowers* somewhat clustered, *axillary, showy, very irregular. Sepals* apparently 4, the 1 notched at apex is probably 2 combined; *rear one large, petal-like, saccate, often spurred.* Petals 2-5. Stamens 5, short; filament with scales on inner side, somewhat united; anthers somewhat united. Ovary oblong, when young 5-celled; cells several-ovuled. Fruit in ours a capsule, oblong or linear, dehiscent into 5 valves. — Only the following genus.

IMPATIENS (TOUCH-ME-NOT)

Petals 4, apparently only 2 by the union of the lateral with the lower. — (Impatient in that the ripe capsule flies into pieces when touched.)

* See Gray's New Manual, American Book Co.

- A. Posterior sepal spurred; corolla often spotted.
 B. Spurred sepals slightly longer than wide; sac at least $\frac{2}{3}$ as wide as long, abruptly contracted into a spur; corolla with large spots, or rarely unspotted. E.
 I. *biflora* (SPOTTED TOUCH-ME-NOT)
 BB. Spurred sepal much longer than wide; sac not over $\frac{1}{2}$ as wide as long, gradually tapering into a spur; corolla unspotted. W. C.
 I. *nolitangere* (GARDEN TOUCH-ME-NOT)
 AA. Posterior sepal unspurred, wider than long; corolla pale yellow, unspotted. E.
 I. *ecalcarata* (SPURLESS TOUCH-ME-NOT)

RHAMNACEAE (BUCKTHORN FAMILY)

Shrubs or trees. Leaves simple, alternate or opposite; stipules minute. Flowers small, perfect or imperfect. Calyx 4-5-cleft. Petals none or distinct, each wrapped around a stamen, on the calyx throat. Stamens as many as calyx lobes, alternate with them. Ovary superior or partly inferior; *styles more or less united into 1; stigmas 2-4.* Fruit either fleshy, or dry and the 2-4 carpels at length separating.

- A. Calyx lobes erect or spreading; fruit berrylike. RHAMNUS (p. 149)
 AA. Calyx lobes connivent; fruit dry or nearly so. CEANOTHUS (p. 149)

RHAMNUS (BUCKTHORN)

Leaves alternate, pinnately veined, deciduous. Flowers in* axillary clusters. Calyx tube urn-shaped. Petals 4-5 or none. Fruit berrylike, oblong or globose, 2-4-seeded. — (Gk. *rhamnos* = the name of these plants.)

- A. Leaves acute at each end; petals none; seed grooved on the back; plants 1.2 m. or less high. E.
 R. *alnifolia*
 AA. Leaves acute at one end or at neither; petals 5, small; seed not grooved on the back.
 B. Plant 5 m. or less high; leaves somewhat revolute at margin; carpels 3. E.
 R. *californica*
 BB. Plants 15 m. or less high; leaves not revolute at margin; carpels 2. W. C. E.
 — Bark much used in medicine. R. *purshiana* (CASCARA)

CEANOTHUS (REDROOT)

Leaves pinnately veined or with several chief veins from the base. Flowers in lateral and terminal clusters. Calyx 5-cleft; lobes deciduous; tube persistent, turbinate or hemispheric. Petals 5, longer than the calyx. Styles 3. Fruit subglobose, 3-lobed, the 3-crustaceous carpels ultimately separating. — (Gk. *keanolhos* = the name of a kind of thistle; probably transferred on account of the spiny branches of some.)

- A. All of the leaves alternate, with 3 chief veins from the base, glandular-toothed or entire; fruit not crested.
 B. Flowers in thyrses; leaves often longer than 30 mm.; branches not strikingly rigid, not spiny.
 C. Leaves evergreen, shining above as if varnished, sticky above, with strong cinnamon odor; flowers white. W. C. E. C. *velutinus* (MOUNTAIN BALM)

- ## VITACEAE (GRAPE FAMILY)

Vitis californica (WILD GRAPE)

A. At least the upper leaves lobed, usually all lobed; palmately veined.
 B. Style-branches filiform, not headlike at tip; carpels 1-ovuled, 1-seeded.
 C. Stamens in 1 series, united; involucre bracts below the calyx 3; carpels 15-20. MALVA (p. 151)
 CC. Stamens in 2 series, united in the outer, distinct in the inner; involucre bracts below the calyx none; carpels 5-9. SIDALCEA (p. 151)
 BB. Style-branches tipped with a headlike stigma.

- D. Carpels 1-ovuled, 1-seeded; upper leaves palmately parted; fruit flat, cheese-shaped. E. — (*Malva* = another genus; + Gk. *astron* = a star; application not apparent.) **Malvastrum coccineum** (FALSE MALLOW)
- DD. Carpels 1-3-ovuled, 1-3-seeded; none of the leaves more deeply lobed than halfway to the base; fruit conic. **SPHAERALCEA** (p. 152)
- AA. Leaves not lobed; palmately or pinnately veined.
- E. Leaves 5 cm. or less wide; carpels 6-10, 1-2-seeded; plants often not densely velvety-pubescent.
- F. Petals red or rose-colored; carpels 1-2-seeded, extended upward as an empty portion. **SPHAERALCEA** (p. 152)
- FF. Petals white or yellow; carpels 1-seeded, filled by the seed. **SIDA** (p. 152)
- EE. Leaves 10-20 cm. wide; carpels 12-15, 3-seeded; plants densely and finely velvety-pubescent. W. — (Meaning unknown.) **Abutilon theophrasti** (VELVET-LEAF)

MALVA (MALLOW)

Flowers solitary in the leaf axils, or rarely in terminal racemes. Petals obcordate. Carpels many, 1-ovuled, in a ring around a broad central axis, free, separating, indehiscent, beakless; axis not projecting beyond the carpels. — (Gk. *malache* = soft; because the crushed herbage is mucilaginous.)

- A. Stem leaves dissected into linear lobes; carpels very hairy; plant erect; flowers 2.5-5 cm. wide. W. **M. moschata** (MUSK MALLOW)
- AA. Stem leaves merely crenate or with rounded shallow lobes; carpels glabrous or puberulent; flowers 0.8-1.4 cm. wide.
- B. Stems procumbent; leaves rounded; carpels puberulent, not reticulate on the back. W. E. **M. rotundifolia** (FAIRY CHEESES)
- BB. Stems erect or ascending; leaves somewhat angular-lobed; carpels glabrous, reticulate on the back. W. **M. parviflora**

SIDALCEA

Annual or perennial. Flowers purple or white, in terminal racemes or spikes. Involucre none. Outer stamens united into 5 sets opposite the 5 petals. Style filiform. Carpels 5-9, 1-seeded, separating at maturity, indehiscent. — (*Sida* = another genus of this family; + Gk. *alkea* = a mallow.)

- A. Petals 8-13 mm. long; calyx 4-8 mm. long.
- B. Flowers in racemes, either simple or paniculate.
- C. Calyx lobes attenuate-acuminate from a wide base. W. **S. glaucescens**
- CC. Calyx lobes broadly deltoid. W. E. **S. oregana**
- BB. Flowers in long dense spikes. U. **S. spicata**
- AA. Petals 15-30 mm. long; calyx 8-15 mm. long.
- D. Petals rose-colored; calyx 6-10 mm. long; mature carpels more or less reticulate on the back.
- E. Stems 4-7 cm. high; carpels glabrous. E. **S. nervata**
- EE. Stems 6-15 dm. high; carpels pubescent. W. E. **S. campestris**
- DD. Petals red; calyx 12-15 mm. long; mature carpels smooth. W. **S. hendersoni**

SPHAERALCEA (GLOBE MALLOW)

Perennial. Involucre 2-3-leaved, setaceous, often deciduous. Stamen column simple; filaments distinct above, many. Styles 5 or more. Seed reniform. — (Gk. *sphaira* = a sphere, *alkea* = a mallow: referring to the commonly spherical fruit.)

A. Leaves canescent, 2.5-5 cm. long, 3-5-lobed, or not lobed; flowers usually scarlet; calyx lobes 4-6 mm. long. E. **S. munroana**

AA. Leaves not canescent, 5-15 cm. long, 3-7-lobed or -cleft; flowers usually rose-colored.

B. Calyx lobes ovate, 4-6 mm. long; pedicels usually less than 6 mm. long. E. **S. rivularis**

BB. Calyx lobes caudate-acuminate, 15-25 mm. long; pedicels 10 mm. or more long. E. **S. longisepala**

SIDA (OBLIQUE MALLOW)

Pubescent or tomentose. Leaves pinnately or palmately veined. Stamen tube simple. Petals oblique. Styles 5 or more. Carpels 6-10, separating from the axis. — (Greek name of some plant.)

A. Plant scurfy-canescant, perennial; leaves reniform to ovate-cordate; calyx subtended by an involucre of 2-3 bractlets. E. **S. hederacea**

AA. Plant glabrous or puberulent, annual; leaves lanceolate to ovate-cordate; calyx not subtended by an involucre. W. **S. acuta**

HYPERICACEAE (ST. JOHN'S-WORT FAMILY)

Herbs. *Leaves opposite*, entire, *pellucid-punctate* or *black-dotted*; *stipules none*. Flowers regular, perfect. Sepals 5. Petals 5. Stamens 5 to many. *Ovary superior*; styles 1-7. Fruit a capsule, septicidal. Seeds many. — Only the following genus.

HYPERICUM (ST. JOHN'S-WORT)

Petals yellow. Capsule 1-6-celled. — (Said to be from Gk. *hyper* = under; + *erica* = a heather.)

A. Plants low, often prostrate or ascending, often matted. W. C. E.

H. anagalloides (CREEPING ST. JOHN'S-WORT)

AA. Plants erect.

B. Plant annual; stamens 5-10; capsule 1-celled. W.

H. majus

BB. Plant perennial; stamens more than 12; capsule 3-celled.

C. Sepals lanceolate, acute or acuminate; capsule not lobed. W.

H. perforatum (COMMON ST. JOHN'S-WORT)

CC. Sepals oval or oblong, obtuse; capsule 3-lobed. W. E.

H. formosum

ELATINACEAE (WATERWORT FAMILY)

Herbs. *Leaves opposite*, entire or serrate; *stipules present*. Flowers small, axillary, solitary or fascicled, perfect, regular.

Sepals 2-5. Petals 2-5. Stamens 1 or 2 times as many as sepals. Ovary superior, 2-5-celled; styles 2-5. Capsule septicidal; placentae central. Seeds many.

A. Flower parts in 2's or 3's or 4's; plant glabrous, aquatic or creeping; sepals obtuse, without midvein. **ELATINE** (p. 153)

AA. Flower parts in 5's; plant pubescent, ascending or diffuse; sepals pointed or acute, with midvein. E. — (Honor of J. P. Bergius, a Swedish botanist.)

Bergia texana

ELATINE (WATERWORT)

Leaves entire. Flowers minute. Sepals 2-4, persistent, membranous. Petals white or rose-colored or purplish. Styles or stigmas 2-4. Pod glabrous. — (Gk. *elate* = the Fir; because some species have narrow, firlike leaves.)

A. Sepals and petals and carpels and stamens 2-3; seed nearly straight; petals rose-colored or purplish.

B. Sepals and petals and stamens usually 3; seeds but little sculptured; leaves oblanceolate. E. **E. triandra**

BB. Sepals and petals and stamens usually 2; seeds distinctly sculptured; leaves obovate. W. E. **E. americana**

AA. Sepals and petals and carpels 3-4; stamens 6-8; seeds curved into a hook or partial ring; petals white; leaves obovate. E.

E. californica (CALIFORNIA WATERWORT)

VIOLACEAE (VIOLET FAMILY)

Herbs. Leaves simple; entire to lacinate, pinnately or palmately veined; *stipules present.* Flowers perfect, *mostly irregular.* Sepals 5. Petals 5, hypogynous. Anthers connivent in a ring or syngenesious. Ovary 1, 1-celled; placentae 3, parietal; style simple. Capsule dehiscent by valves. — Only the following genus.

VIOLA (VIOLET)

Leaves alternate or all basal, evergreen or deciduous. Flowers solitary or rarely 2 together, long-peduncled. Lower petal large, spurred or saccate. Stamens 5. — (The Latin name.)

A. Leaves cleft or more deeply separated into lobes or divisions; stem present; petals yellow, the upper one brownish or purplish.

B. Leaves once lobed or dissected into 5-9 lobes or teeth; with creeping rhizomes. U. **V. lobata**

BB. Leaves 2-3 times dissected or lobed; lobes usually more than 9; without creeping rhizomes.

C. Petals beardless, yellow or the upper one brownish.

D. Leaves short-pubescent, ternately divided into 3 segmented lobes. U.

V. chrysantha

DD. Leaves glabrous, pinnately divided into 5 or more segmented lobes. U. C.

V. sheltoni

- CC. Lateral petals bearded with a tuft of hairs; upper petals deep blue or violet-purple.
- E. Plant pubescent; leaves rounded in general outline, and their segments linear or linear-spatulate. C. E. *V. beckwithii*
- EE. Plant glabrous; leaves either not rounded in general outline, or else their lobes lanceolate or ovate-lanceolate.
- F. Leaf segments veinless or obscurely veined; stipules adnate, often large, lacinate or entire. W. *V. hallii*
- FF. Leaf segments prominently 3-veined; stipules free, small, entire. E. *V. trinervata*
- AA. Leaves very shallowly lobed or merely toothed or even entire.
- G. Petals yellow.
- H. Stems prostrate, stolon-like; leaves evergreen.
- I. Leaves cordate; leafy branches producing petal-bearing flowers. W. C. E. *V. sempervirens* (EVERGREEN VIOLET)
- II. Leaves reniform; leafy branches producing only apetalous flowers. C. E. *V. orbiculata*
- HH. Stems erect, not stolon-like; leaves not evergreen.
- J. Plant glabrous.
- K. Leaves ovate or ovate-lanceolate, acute or obtuse; capsule globose, pubescent. W. C. E. *V. venosa*
- KK. Leaves round-cordate or reniform, acuminate or acute; capsule oblong, glabrous. W. C. E. *V. glabella*
- JJ. Plant pubescent. W. C. E. *V. nuttallii* (HAIRY YELLOW VIOLET)
- GG. Petals some other color.
- L. Plants stemless.
- M. Plant hirsute or villous, not stoloniferous; petals 10-17 mm. long, blue or violet, all bearded at base. E. *V. cuspidata*
- MM. Plant glabrous or very nearly so.
- N. Leaves ovate to spatulate-oblong, attenuate to the petiole; plant stoloniferous. U. *V. primulaefolia* (PRIMROSE VIOLET)
- NN. Leaves truncate to cordate at base, not attenuate to the petiole.
- O. Petals 6-8 mm. long, white or light blue or violet, lower ones with purple veins; plants stoloniferous.
- P. Corolla white; lower 3 petals with purple lines. W. C. E. *V. blanda*
- PP. Corolla violet. W. C. E. *V. palustris* (MARSH VIOLET)
- OO. Petals 10-25 mm. long, violet.
- Q. Petals 10-17 mm. long; plant not stoloniferous; stipules less than 12 mm. long. W. E. *V. nephrophylla*
- QQ. Petals 19-25 mm. long; plant stoloniferous; stipules 12-21 mm. long. W. *V. langsdorffii*
- LL. Plants with stems.
- R. Stipules or at least those of the basal leaves serrate or lacinate, scarious or herbaceous.
- S. Plant puberulent or glabrous; stipules herbaceous.
- T. Leaves usually brown dotted at least beneath; none of the stipules entire.
- U. Plant usually 7-30 cm. high, glabrous; leaves 1.3-3.8 cm. long. W. C. E. *V. adunca*
- UU. Plant 3-5 cm. high, densely puberulent; leaves 1-2 cm. long. W. C. *V. arenaria* (SAND VIOLET)
- TT. Leaves not dotted; stipules of the stem leaves entire. W. *V. howellii*
- SS. Plant pubescent.
- V. Pubescence retrorse; stipules herbaceous; flowers violet. W. C. E. *V. retroscabra*

- VV.** Pubescence not retrorse; stipules scarious; flowers white or somewhat yellowish, with purplish veins. U. **V. ocellata**
RR. Stipules all entire, scarious.
W. Leaves rhombic-ovate with cuneate bases, except sometimes the basal. U. **V. cuneata**
WW. Leaves cordate or reniform.
X. Leaves cordate, acuminate. E. **V. canadensis** (CANADA VIOLET)
XX. Leaves reniform, obtuse. W. **V. flettii**

LOASACEAE (STICK-LEAF FAMILY)

Herbs, erect often with hooked or stinging or viscid hairs. Leaves alternate, pinnately veined, simple; stipules none. Flowers regular, perfect, white or yellow. Calyx 5-lobed, persistent. Petals on the calyx, 5-10. Stamens many, on the calyx. Ovary inferior, 1-celled; placentae 2-3, parietal. Capsule 1-celled. — Only the following genus.

MENTZELIA (STICK LEAF)

Leaves mostly coarsely toothed or pinnatifid. Calyx tube cylindric to obconic. Stamens 20-300. — (Honor of C. Mentzel, a German botanist.)

- A.** Biennials; flowers 2.5-6.3 cm. long; each placenta with 2 rows of ovules; capsule linear.
B. Leaves lanceolate; petals 10.
C. Outer petals less than 5 cm. long; plant 2-2.5 dm. high; some of the anther-bearing filaments dilated. E. **M. pumila**
CC. Outer petals 5-6.2 cm. long; plant 6-9 dm. high; all of the filaments filiform. E. **M. laevicaulis**
BB. Leaves linear; petals 5. E. **M. brandegei**
AA. Annual; flowers 0.3-1.6 cm. long; each placenta with 1 row of ovules; capsule oblong.
D. Seed tuberculate, more or less grooved along the angles; leaves usually sinuate-toothed. E. **M. integrifolia**
DD. Seed smooth or striate.
E. Flowers not bracted; seed 0.7-1.4 mm. long. E. **M. albicaulis**
EE. Flowers conspicuously bracted with wide-toothed bracts; seed almost 2 mm. long. E. **M. congesta**

CACTACEAE (CACTUS FAMILY)

Stems fleshy, spiny, the spines arising from cushions of minute bristles. Leaves none or mere spines. Flowers perfect, regular, showy. Calyx many-lobed or of distinct sepals. Petals many. Stamens many. Ovary inferior, 1-celled; placentae several, parietal. Fruit mostly fleshy. Seeds many.

- A** Stems not jointed, ovoid, not branched; "eyes" raised on tubercles. E. — (L. *mamilla* = a nipple; referring to the tubercles.) **Mamillaria vivipara** (BALL CACTUS)
AA. Stems jointed, branched; "eyes" not raised on tubercles. **OPUNTIA** (p. 156)

OPUNTIA (OPUNTIA)

"Eyes" spine-bearing. Flowers lateral. Calyx lobes spreading. Ovary cylindric. Fruit pear-shaped. — (Grew in Greece near the town of Opuntia.)

A. Joints of the stem decidedly flattened; spines 8–15 from the same place. E.

O. polycantha (SPINY OPUNTIA)

AA. Joints of the stem ovate or subglobose, nearly terete; spines 1–4 from the same place. W. E.

O. fragilis (FRAGILE OPUNTIA)

ELEAGNACEAE (OLEASTER FAMILY)

Shrubs, silvery-scaly or stellate-pubescent. Leaves opposite. Flowers imperfect, clustered or rarely solitary. Perianth of pistillate flowers tubular or urn-shaped below; limb 4-cleft, deciduous. Corolla none. Stamens 8. Ovary 1-celled. Fruit drupelike, red. Seed 1. W. C. E. — (Honor of J. Shepherd, curator of the Liverpool Botanic Gardens.)

Shepherdia canadensis (SOAP-OLALLEE)

LYTHRACEAE (LOOSESTRIFE FAMILY)

Herbs; stem 4-angled. Leaves opposite or alternate. Flowers perfect. Calyx persistent, free from the ovary but usually inclosing it, toothed. Petals as many as the sepal teeth of the calyx. Stamens various in number, on the calyx. Ovary 1–6-celled; style 1. Fruit a capsule.

A. Calyx tube campanulate, 4-striate; leaves all opposite, not rounded at base.

B. Leaves linear-lanceolate, sessile, cordate-auricled and somewhat clasping at base; capsule bursting irregularly. W. E. — (Honor of P. Ammann, a German botanist.)

Ammania coccinea

BB. Leaves oblong or linear-oblong, sessile or petioled, narrowed at base, not auricled nor clasping; capsule septicidal. E. — (Diminutive of *L. rota* = a wheel; referring to whorled leaves of some species.)

Rotala ramosior (ROTALA)

AA. Calyx tube cylindric, 8–12-striate; leaves alternate or the lower opposite, sessile, rounded at base, not clasping. W. — (Gk. *lythron* = blood; from the purple flowers of some.)

Lythrum hyssopifolium (LOOSESTRIFE)

ONAGRACEAE (EVENING-PRIMROSE FAMILY)

Herbs. Leaves simple, alternate or opposite; stipules none or mere glands. Flowers perfect, regular or irregular. Calyx tube adherent to the ovary, often prolonged beyond it; calyx limb 2–6-lobed, but usually 4-lobed. Petals 0 or 2 or 4. Stamens usually as many or twice as many as the sepals. Ovary inferior, 1–6-celled; style 1. Fruit a capsule or nutlet.

- A. Leaves opposite, not all basal.
- B. Calyx segments 2, petals 2, stamens 2; capsule obovate, leaves ovate to cordate. **CIRCAEA** (p. 161)
- BB. Calyx segments 4, petals 4, stamens 4 or 8; capsule mostly not obovate; leaves in most species narrow.
- C. Stems procumbent or floating; leaves entire; stamens 4; capsules about 3 mm. long; calyx segments persistent on the capsule; seeds not hairy. W. E. — (Honor of C. G. Ludwig, a German botanist.)
Ludwigia palustris (WATER PURSLANE)
- CC. Stems neither procumbent nor floating, erect to decumbent or caespitose; leaves often not entire; stamens 8; capsule 10 mm. or more long; calyx segments deciduous from the capsule; seed long-hairy at one end.
EPILOBIUM (p. 158)
- AA. Leaves alternate or all basal.
- D. Plants with evident stems.
- E. Lower leaves often opposite; stamens 8; seed with a tuft of long hairs at one end. **EPILOBIUM** (p. 158)
- EE. Leaves all alternate; stamens 4 or 8; seed without a tuft of hairs at one end.
- F. Anthers versatile.
- G. Stigma plainly 4-lobed or -cleft; leaves not entire.
- H. Flowers axillary, white, becoming rose-colored in age; some species with pinnatifid leaves; capsule not nutlike, elongated, many-seeded; seeds in 1 row in each cell of the pod. **ANOGRA** (p. 160)
- HH. Flowers in terminal spikes, yellow or rose-colored; no species with pinnatifid leaves.
- I. Petals yellow, sometimes becoming pink in age, obcordate; capsule elongated, not nutlike, many-seeded; seeds in two rows in each cell.
ONAGRA (p. 159)
- II. Petals rose-colored, spatulate; capsule oblong, nutlike, 1-4-seeded.
E. — (Gk. *gauros* = superb; some species have fine flowers.)
Gaura parviflora (SMALL-FLOWERED GAURA)
- GG. Stigma either 2-lobed or else capitate and not lobed; leaves entire or not.
- J. Leaves lyrate-pinnate or pinnatifid. **CHYLISMA** (p. 161)
- JJ. Leaves entire or denticulate.
- K. Leaves denticulate or entire, linear or wider; calyx tube prolonged beyond the ovary; ovary 4-celled. **SPHAEROSTIGMA** (p. 160)
- KK. Leaves entire, linear; calyx tube not prolonged beyond the ovary; ovary 2-celled. **GAYOPHYTUM** (p. 161)
- FF. Anthers not versatile.
- L. Fruit dehiscent by valves, elongated, not nutlike, many-seeded; leaves entire to dentate.
- M. Calyx lobes erect; petals 2-lobed, sessile. **BOISDUVALIA** (p. 158)
- MM. Calyx lobes reflexed; petals 3-lobed or entire.
- N. Petals sessile, entire, rose or violet; leaves entire. **GODETIA** (p. 159)
- NN. Petals clawed, 3-lobed or entire, purple or violet; leaves entire to dentate. **CLARKIA** (p. 158)
- LL. Fruit indehiscent, nutlike, 1-2-seeded; stigma disklike, entire; petals clawed; leaves entire. U. — (Gk. *heteros* = unlike; + *Gaura* = another genus.)
Heterogaura californica

DD. Plants stemless or nearly so, the stems not over 3 cm. long.

O. Stigma capitate, entire or rarely with 4 shallow lobes; stamens of equal length; petals white or yellow; pod not winged. **TARAXIA** (p. 160)

OO. Stigma deeply cleft into 4 linear lobes; outer 4 stamens longer than the inner 4; petals white or rose-colored.

P. Capsule not wing-angled; seed grooved on one side; leaves entire to pinnatifid. **PACHYLOPHUS** (p. 160)

PP. Capsule wing-angled; seed not grooved; leaves pinnatifid. **E.** — (Honor of Delavaux, the founder of a French botanical garden.)

Lavauxia trilobata (3-LOBED PRIMROSE)

EPILOBIUM (WILLOW-HERB)

Annual or perennial. Leaves nearly sessile, entire or denticulate. Flowers variously colored, racemose or paniculate. Calyx tube not conspicuously prolonged beyond the ovary; calyx deeply 4-lobed. Petals 4. Stamens 8, 4 shorter. Capsule linear, 4-sided, 4-celled, 4-valved. Seeds many, with a tuft of hair at the summit. — (Gk. *epi* = on, *lobion* = a little pod.)

A. Calyx tube not extending beyond the ovary; flowers pink, 15 mm. or more wide.

B. Stem 10–20 dm. high; leaves with a conspicuous vein along the margin; bracts small, not leaflike. **W. C. E.** **E. angustifolium** (FIREWEED)

BB. Stem 1.5–5 dm. high; leaves without vein along the margin; bracts large, leaflike. **W. C. E.** **E. latifolium**

AA. Calyx tube extending beyond the ovary; flowers white or pink or yellow, often less than 15 mm. wide. — These, though common, are too difficult for beginners. (**F. & R.** pp. 262–264.)

BOISDUVALIA

Annual. Leaves sessile. Flowers small, in spikes; spikes leafy, simple or compound. Calyx tube funnelform, deciduous. Petals 4, white to purple. Stamens 8, 4 shorter. Capsule membranous, 4-celled, nearly terete, sessile, acute. — (Honor of J. H. Bois Duval, a French naturalist.)

A. Upper leaves much wider than the lower ones; flowers often in numerous lateral spikelets. **W. E.** **B. densiflora**

AA. Upper leaves not wider than the lower ones; flowers in simple terminal spikes or solitary in the leaf axils.

B. Leaves narrowly lanceolate, pubescent; capsule linear-acuminate, 8–12 mm. long, its cells 6–8-seeded. **W. E.** **B. stricta**

BB. Leaves ovate-lanceolate, often glabrous; capsule ovate-oblong, 4–8 mm. long, its cells 4–6-seeded. **E.** **B. glabella**

CLARKIA

Annual, erect; stems brittle. Leaves entire. Flowers showy, in terminal racemes. Calyx tube obconic, deciduous; calyx limb 4-cleft. Petals 4. Stamens 8, 4 often rudimentary. Capsule 4-celled, coriaceous, erect, angled, 4-celled. Seeds many. — (Honor of W. Clark, of the Lewis and Clark Expedition.)

- A.** Petals 3-lobed, their claws long; alternate stamens rudimentary; capsule 8-angled; pedicel 4-6 mm. long. **E.** *C. pulchella*
AA. Petals entire, their claws short, wide; all stamens pollen-bearing; capsule 4-angled; pedicel 1-3 mm. long. **C. E.** *C. rhomboidea*

GODETIA (FAREWELL-TO-SPRING)

Annual; stems erect. Flowers showy, in racemes or spikes. Calyx tube obconic or shortly funnelform, deciduous. Petals 4. Stamens 8, 4 shorter. Capsule 4-celled, 4-sided, somewhat coriaceous, loculicidal. — (Honor of M. Godet, a Swiss botanist.)

- A.** Flowers in a narrow compact spike, erect in the bud; capsule ovate to oblong; seeds in 1 or 2 rows; leaves close together.
B. Tips of the calyx lobes not at all free in the bud; sides of the capsule not 2-ribbed; seeds in 2 rows in each cell. **W.** *G. purpurea*
BB. Tips of the calyx lobes slightly free in the bud; capsule 2-ribbed at least on the alternate sides; seeds in one row in each cell.
C. Flowers in a short simple spike. **W.** *G. lepida*
CC. Flowers in many short lateral spikelets. **W.** *G. albenscens*
AA. Flowers in a loose spike or a raceme, nodding in the bud; capsule linear; seeds in 1 row; leaves distant.
D. Capsule sessile; calyx tips mostly free.
E. Petals 6-12 mm. long.
F. Ovary and capsule villous; capsule 2-ribbed at the alternate sides. **W. E.** *G. quadrivulnera*
FF. Ovary and capsule puberulent; capsule nearly flat at the sides. **U.** *G. tenella*
EE. Petals 18-30 mm. long. **W. C.** *G. viminea*
DD. Capsules with pedicels; calyx tips mostly not free.
G. Petals 6-12 mm. long; pedicel of capsule 1-4 mm. long. **W. E.** *G. epilobioides*
GG. Petals 12-30 mm. long; pedicel of capsule 4-15 mm. long.
H. Plant minutely puberulent; stem somewhat branched above.
I. Anthers sparingly hairy, large, the terminal part sterile and often hooked. **W.** *G. caurina*
II. Anthers glabrous, small, fertile to the tips. **W. C. E.** *G. amoena* (HERALD-OF-SUMMER)
HH. Plant hispid with short spreading hairs; stem simple. **W.** *G. hispida*

ONAGRA (EVENING PRIMROSE)

Annual or biennial; stems 3-15 dm. high, coarse. Leaves alternate. Flowers yellow, changing to pink in age, nocturnal, erect before opening. Calyx tube more or less prolonged above the ovary, deciduous; calyx segments 4, reflexed. Petals 4, equal, sessile, obcordate to obovate. Stamens 8, equal; anthers versatile. Stigma deeply 4-cleft. Seeds in 2 or rarely more rows, prismatic-angled. — (Said to be from Gk. *onagros* = the wild ass, whose ears the leaves resemble.)

- A.** Petals 1-2 cm. long; calyx lobes shorter than the calyx tube. **W. E.** *O. strigosa*
AA. Petals 2.5-4 cm. long.
B. Calyx lobes nearly glabrous, shorter than the calyx tube; annual, erect. **E.** *O. macbrideae*

BB. Calyx lobes densely hairy, as long as or longer than the calyx tube; biennial.

C. Flowers yellow or purplish, drying lighter; stems erect. W. E. *O. hookeri*

CC. Flowers yellow, drying darker; stems spreading. E. *O. ornata*

ANOGRA (WHITE EVENING PRIMROSE)

Annual or perennial. Flowers diurnal, nodding in bud. Calyx tube prolonged above the ovary, deciduous; calyx segments 4, narrow. Stamens 8, unequal; anthers versatile. Capsule loculicidal. — (An anagram of *Onagra*.)

A. Calyx villous or densely strigose; at least some of the leaves deeply pinnatifid. E. *A. trichocalyx*

AA. Calyx glabrate or sparsely hairy; leaves entire to merely short-lobed.

B. Leaves glabrous; capsules divaricate, usually some of them contorted or twisted.

E. *A. pallida*

BB. Leaves pubescent beneath; capsules ascending, straight. E. *A. nuttallii*

PACHYLOPHUS (STEMLESS EVENING PRIMROSE)

Herbs, perennial. Flowers large, white or rose-colored. Calyx tube elongated; limb 4-parted, erect in the bud. Petals 4, sessile, white but changing to red in age. Capsule ovate or ovate-oblong, large, rigid, 4-angled. Seeds in 1 or 2 rows. — (Gk. *pachys* = thick, *lophis* = a crest; referring to the warty edges of the capsule.)

A. Plant wholly glabrous throughout; petals 2-4 cm. long. E. *P. caespitosus*

AA. Plant more or less pubescent or hairy; petals 4-6 cm. long.

B. Leaves green, glabrous except for the villous margin. E. *P. marginatus*

BB. Leaves canescent-puberulent on both sides. E. *P. canescens*

TARAXIA

Leaves entire to pinnatifid. Flowers axillary. Calyx tube filiform, longer than the ovary; limb 4-parted. Petals 4. Stamens 8. Capsule sessile. Seeds in 2 rows in each cell. — (Gk. *taraxis* = trouble or confusion; apparently a puzzling genus.)

A. Leaves deeply pinnatifid.

B. Plant white-pubescent. E. *T. breviflora*

BB. Plants glabrous or nearly so. (See D.)

AA. Leaves entire to repand-denticulate.

C. Plant perennial, glabrous or somewhat pubescent; leaves oblong-lanceolate.

D. Plant glabrous; capsule 1.5-2 cm. long; seeds many. E. *T. heterantha*

DD. Plant somewhat pubescent; capsule 1.2 cm. long; seeds few. E. *T. ovata*

CC. Plant annual, villous; leaves linear. E. *T. gracilliflora*

SPHAEROSTIGMA

Flowers solitary or in spikes, white or rose-colored or yellow. Calyx tube obconic or shortly funnelform; calyx segments 4, reflexed. Petals 4. Stamens 8, somewhat unequal. Stigma capitate, entire. Capsule elongated. Seeds in 1 row in each cell. — (Gk. *sphaira* = sphere; + stigma; because the stigma is capitate.)

- A. Flowers yellow or yellowish, sometimes turning red or green.
 B. Capsule linear, more or less contorted.
 C. Stem glabrous; leaves 6-18 mm. long; petals 2-4 mm. long. W. E. **S. contortum**
 CC. Stems not glabrous; leaves longer; petals 6-8 mm. long.
 D. Stem puberulent; capsule 20-25 mm. long. E. **S. implexum**
 DD. Stem pubescent; capsule 8-16 mm. long. U. **S. spirale**
 BB. Capsule attenuate upward from a wider base, straight.
 E. Seeds pale, linear; flowers barely 2 mm. long. E. **S. andinum**
 EE. Seeds dark, obovate or clavate; flowers 2-4 mm. long. E. **S. hilgardi**
 AA. Flowers white or rose-color.
 F. Leaves oblanceolate. E. **S. tortum**
 FF. Leaves ovate. E. **S. boothii**

CHYLISMA

Annual. Flowers yellow or rose-colored, in terminal racemes. Calyx tube funnellform or obconic; calyx segments 4. Petals 4, entire. Stamens 8, 4 shorter. Stigma capitate, entire. Capsule long, membranous, not sessile. Seeds in 1 row in each cell. — (Probably Gk. *chylos* = plant juice.)

- A. Flowers yellow. E. **C. scapoidea**
 AA. Flowers rose-colored. E. **C. cruciformis**

GAYOPHYTUM

Annual. Flowers axillary. Calyx segments 4. Petals 4, white or rose-colored, very small. Stamens 8, 4 shorter. Stigma entire. Capsule membranous, clavate, 2-celled, 4-valved. Seeds in 1 row in each cell. — (Probably Gk. *gaios* = on land, *phyton* = a plant.)

- A. Seed hairy.
 B. Stem 2-3 dm. high; petals about 2 mm. long; pod scarcely torulose. C. E. **G. lasiospermum**
 BB. Stems 3-5 dm. high; petals 6-8 mm. long; pod torulose. E. **G. eriospermum**
 AA. Seed glabrous.
 C. Capsule nearly sessile; branches nearly all from near the base of the stem. C. E. **G. racemosum**
 CC. Capsules on elongated pedicels; branches mostly from the upper part of the stem.
 D. Flowers 5-12 mm. wide. E. **G. diffusum**
 DD. Flowers 2-4 mm. wide. C. E. **G. ramossissimum**

CIRCAEA (ENCHANTER'S NIGHTSHADE)

Perennial, low. Flowers small, white, in terminal and lateral racemes. Stamens alternate with the petals. Fruit a capsule, small, densely hispid with hooked hairs, indehiscent, 1-celled, 1-seeded. — (Honor of Circe, a Greek enchantress, who is said to have used these plants.)

- A. Leaves dentate; racemes with minute setaceous bracts subtending the pedicels.
 W. C. E. **C. alpina**
 AA. Leaves undulate-denticulate; racemes bractless. W. C. E. **C. pacifica**

HALORAGIDACEAE (WATER-MILFOIL FAMILY)

Herbs glabrous, aquatic. Some of the leaves whorled, the submerged ones often pectinate-pinnatifid. Flowers rare. Calyx entire or 2-4-lobed. Petals none or 2-4. Stamens 1-8. Ovary inferior. Fruit a nutlet or drupe.

A. Submerged leaves pinnatifid into capillary segments, 3-5 in a whorl or rarely some scattered; stem not *Equisetum*-like. — (Gk. *myrios* = numberless, *phyllon* = a leaf; the leaves are split into very many segments.) Species too difficult. (F. & R. p. 269.)

Myriophyllum (WATER MILFOIL)

AA. All leaves linear or wider, simple, entire, 4-12 in a whorl; stem conspicuously jointed and somewhat *Equisetum*-like. W. C. E. — (Gk. *hippos* = a horse, *oura* = a tail; from the resemblance of the leafy stem.)

Hippuris vulgaris (MARE'S TAIL)

ARALIACEAE (GINSENG FAMILY)

Herbs or shrubs, perennial. Leaves alternate or whorled. Flowers perfect or polygamous, clustered. Calyx limb truncate or toothed or none. Petals usually 5. Stamens as many as the petals and alternate with them, rarely more on the epigynous disk. Ovary usually inferior. Fruit a berry or drupe.

A. Shrubs; leaves simple.

B. Erect or decumbent, not vining, very prickly; twigs 1-2.5 cm. thick; leaves deciduous, prickly, 15-50 cm. long. W. C. E. — (The Japanese common name for one of the species.)

Fatsia horrida (DEVIL'S CLUB)

BB. Vining, climbing by roots from the vines, not prickly; twigs smaller; leaves evergreen, smooth, 3-15 cm. long. W. — Planted for decorating walls. (Celtic *hedra* = a cord; from the vining stems.)

Hedera helix (ENGLISH IVY)

AA. Herbs; leaves compound.

C. Leaves not whorled, pinnate or ternate, usually 2-compound; fruit not red.

ARALIA (p. 162)

CC. Leaves 3 in a whorl, palmate, 1-compound; fruit red. W. — Cultivated for its medicinal roots. (Gk. *pan* = all, *akos* = a cure; from reputed medicinal properties.)

Panax quinquefolium (GINSENG)

ARALIA

Herbs. Leaves alternate. Flowers small, in umbels, white or greenish. Calyx truncate or 5-toothed. Petals 5. Styles 5. Fruit a small berry. Seeds about 5. — (Meaning undetermined.)

A. Plant stemless or nearly so; leaf 1, ternate and each division ternately or pinnately 3-5-foliate; umbels commonly 3, simple, not involucre. E.

A. nudicaulis (WILD SARSAPARILLA)

AA. Plant with stem 2-3 m. high; leaves many, 1-2-pinnate; umbels many, involucre. C.

A. californica (CALIFORNIA SPIKENARD)

UMBELLACEAE (CARROT FAMILY)

Herbs. Leaves simple to decompose, *alternate*; stipules none or minute. Flowers small, *usually in umbels*, rarely in heads or headlike clusters, umbels simple or compound. *Calyx limb none or 5-lobed; lobes inconspicuous.* Petals 5, on the calyx. Stamens 5, on the epigynous disk; *anthers versatile.* Ovary *inferior, 2-celled*; styles 2, persistent, often on a conic or depressed stylopodium. Fruit dry; *carpels 2, 1-seeded*, with 0 or 5 chief ribs, sometimes with 4 other smaller ribs, usually separating at maturity along their plane of union (commissure), after separation borne on a slender axis (carpophore); ribs often winged; oil tubes usually present.

This difficult family depends upon the oil tubes in the fruit for the separation of the genera. To see these, cut a thin cross section of a carpel with a sharp knife and examine with the low power of the compound microscope. The oil tubes are hollows just outside the seed cavity. The key is given mostly to the genera only. It is doubtful whether beginners should go beyond the family. (F. & R. pp. 271-290.)

A. Leaves simple.

B. Leaves awl-shaped to lanceolate or oblanceolate or oblong.

C. Leaves entire; flowers white or yellow, in umbels. **GROUP 3, BB** (p. 165)

CC. Leaves lobed to dentate; flowers white or blue, in dense somewhat spiny heads. **GROUP 1, A** (p. 163)

BB. Leaves ovate to orbicular or kidney-shaped.

D. Marsh or water plants; leaves kidney-shaped, wider than long; umbel simple. **GROUP 3, B** (p. 165)

DD. Not marsh nor water plants; leaves ovate or longer, at least longer than wide; umbel compound. **GROUP 1, B** (p. 163)

AA. Leaves compound or very deeply dissected.

E. Fruit conspicuously bristly or scaly. **GROUP 1** (p. 163)

EE. Fruit not bristly nor scaly.

F. Fruit strongly flattened dorsally; lateral ribs more or less prominently winged. **GROUP 2** (p. 164)

FF. Fruit not strongly flattened dorsally, usually somewhat flattened laterally.

G. Oil tube 0-1 in each interval. **GROUP 3** (p. 165)

GG. Oil tubes more than 1 in each interval. **GROUP 4** (p. 166)

GROUP 1

A. Flowers in dense bracted prickly heads. — (Said to be from Gk. *erygein* = to belch; some were thought a remedy for flatulency.) **Eryngium (ERYNGO)**

AA. Flowers in compound umbels, the umbellets often in headlike clusters, but then not or hardly bracted.

- B.** Fruit covered with hooked bristles; leaves merely coarsely lobed or 1-compound. — (*L. sanare* = to heal; because a common European species is vulnerary.) **Sanicula** (SANICLE)
- BB.** Fruit with bristles only on the ribs; leaves finely dissected or more than 1-compound.
- C.** Bristles of the fruit barbed with arrowhead-like tips; stylopodium none. **DAUCUS** (p. 167)
- CC.** Bristles of the fruit not barbed, or merely hooked by the curved tips; stylopodium conical or short.
- D.** Calyx lobes prominent; fruit ovate or oblong; oil tube 1 in each interval; leaves pinnately dissected into small narrow divisions. **W. E.** — (The Greek name.) **Caucalis microcarpa** (HEDGE PARSLEY)
- DD.** Calyx lobes none; fruit linear-oblong or linear; oil tubes none or numerous; leaves ternately decompound; leaflets wide, ovate, toothed. — (Honor of George Washington, the first President.) **Washingtonia** (SWEET CICELY)

GROUP 2

- A.** Oil tube 1 in each interval.
- B.** Plant with a leafy stem.
- C.** Flowers greenish or white or purplish.
- D.** Plant either slender or else pubescent at least in the umbels; stylopodium conic.
- E.** Plant slender, glabrous; fruit glabrous. **E.** — (Probably *Gk. oxy* = sharp, *polion* = a plant with a strong odor.) **Oxypolis occidentalis** (COWBANE)
- EE.** Plant stout, pubescent at least in the umbels; fruit hairy.
- F.** Leaves 1-2-pinnate; leaflets oblong to linear-lanceolate, 2.5-5 cm. long. **E.** — (*Gk. sphen* = a wedge, *skiadion* = an umbrella; probably referring to the form of the fruit.) **Sphenosciadium capitellatum**
- FF.** Leaves large, ternate; leaflets round-cordate, 10-25 cm. long. **W. C. E.** — (Honor of Hercules.) **Heracleum lanatum** (COW PARSNIP)
- DD.** Plant stout and glabrous; stylopodium flat or none. (See **H.**) **Angelica**
- CC.** Flowers yellow. **W. E.** — Raised for the edible roots. (*L. pastus* = food.) **Pastinaca sativa** (CULTIVATED PARSNIP)
- BB.** Leafy stem none or almost none. — (*Gk. loma* = a border; referring to the fruit wings.) **Lomatium** (HOG FENNEL)
- AA.** Oil tubes more than 1 in each interval.
- G.** Stem leafy, branching.
- H.** Leaves ternately or pinnately 1-3-compound. — (Angelic in its supposed medicinal value.) **Angelica** (ANGELICA)
- HH.** Leaves many times compound. — (From the genera *Conium* and *Selinum*, both of which these plants resemble.) **Conioselinum** (HEMLOCK PARSLEY)
- GG.** Stem none or leafless and unbranched.
- I.** Lateral wings of the fruit thin.
- J.** Stylopodium none; calyx teeth minute or none; dorsal ribs of the carpels filiform.

K. Leaves ternate to dissected; leaflets narrow or small.

(See **BB.**) *Lomatium* (HOG FENNEL,

KK. Leaves 1-2-compound; leaflets wide, sharply toothed. U. — (Gk. *eryon* = extended, *pteron* = wing; referring to the fruit wings.)

Eryptera howellii

JJ. Stylopodium evident but flat; calyx teeth evident; dorsal ribs of the carpels sharp or winged. C. E. — (Gk. *kyon* = a dog, *marathron* = fennel; application not apparent.)

Cynomarathrum brandegei

II. Lateral wings of the fruit thick.

L. Dorsal ribs of the carpels very prominent or slightly winged. — (Gk. *pseudos* = false; + *Cymopterus*, a related genus.)

Pseudocymopterus

LL. Dorsal ribs of the carpels filiform.

M. Plant dwarf; leaves small, lobed or pinnate. E. — (Gk. *cyma* = a wave, *pteron* = a wing; the wings of the fruit are often wavy.)

Cymopterus leibergii

MM. Plant tall, stout; leaves large, pinnately decompound. — (Gk. *leptos* = slender, *taenion* = a band; referring to the filiform fruit ribs.)

Leptotaenia

GROUP 3

A. Leaves simple.

B. Leaves kidney-shaped, 3-7-lobed and somewhat crenate. W. — (Gk. *hydor* = water, *kotyle* = a flat cup; some species have somewhat cup-shaped peltate leaves.)

Hydrocotyle ranunculoides (WATER PENNYWORT)

BB. Leaves linear to oblong, entire.

C. Leaves awl-shaped, hollow, with cross partitions; flowers white; umbel simple. W. — (From *Lilaea*, a genus which it resembles; + Gk. *opsis* = like.)

Lilaeopsis occidentalis

CC. Leaves linear to lanceolate, not hollow, without cross partitions; flowers yellow; umbel compound. — (Gk. *bous* = an ox, *pleuron* = a rib; referring to the conspicuous leaf veins of some species.)

Bupleurum americanum (THOROUGHWAX)

AA. Leaves compound or very nearly so.

D. Oil tubes none; carpels smooth, linear.

E. Fruit acute-ribbed. — (Honor of George Washington, the first President.)

Washingtonia (SWEET CICELY)

EE. Fruit not ribbed except at the beak. E. — (The Latin name.)

Anthriscus cerefolium (BEAKED PARSLEY)

DD. Oil tube 1 at the base of each groove.

F. Flowers white or rose color.

G. Stylopodium conic.

H. At least the upper leaflets linear or filiform.

I. Involucre none; leaflets flabelliform or the upper leaves merely cleft. W. — Cultivated for its seed as a spice. (Gk. *koris* = a bug; from the buglike odor of the leaves.)

Coriandrum sativum (CORIANDER)

II. Involucre present; leaflets dissected into filiform divisions.

CARUM (p. 167)

HH. Leaflets wider than linear.

J. Involucre bracts few or none. — Roots poisonous. (The Latin name.)

Cicuta (WATER HEMLOCK)

- JJ.** Involucre bracts conspicuous. U. — (Gk. *taenion* = a band; *pleuron* = a rib; referring to the wide ribs of the carpels.) **Taeniopleurum howellii**
- GG.** Stylopodium flat or none.
- K.** At least the lateral ribs thick and corky.
- L.** Plants in water or very wet places; dorsal ribs of the carpels filiform. W. C. — (Gk. *oinos* = wine, *anthos* = a flower; some species were used for scenting wine.) **Oenanthe sarmentosa** (WATER CELERY)
- LL.** Plants of rather dry soil; dorsal ribs of the carpels prominent and corky.
- M.** Ribs of the carpels much wrinkled when old; involucre none; fruit 3 mm. long. E. — (Gk. *rhysos* = wrinkled, *pteron* = a wing; referring to the fruit wings.) **Rhysopterus plurijugus**
- MM.** Ribs of the carpels not wrinkled; involucre present; fruit not over 2 mm. long. W. — (Greek name for some plant of this family.) **Ammi visnaga** (TOOTHPICK PLANT)
- KK.** Ribs obscure or none. E. — (Honor of Mr. Leiberg, an American botanist.) **Leibergia orogenioides**
- FF.** Flowers yellow; stylopodium flat or none.
- N.** Ribs of the carpels conspicuously winged. E. — (A modification of *Thapsia*, a related genus.) **Thaspium aureum** (GOLDEN MEADOW PARSNIP)
- NN.** Ribs of the carpels filiform. E. — (Honor of I. B. Ziz, a Rhenish botanist.) **Zizia cordata** (HEART-LEAVED ALEXANDERS)

GROUP 4

- A.** Stylopodium conic.
- B.** Fruit round; carpels globose; carpel ribs very slender, inconspicuous. W. E. — (The Latin name of the Water Cress.) **Berula erecta**
- BB.** Fruit ovate or oblong.
- C.** Ribs of the carpels prominent, equal.
- D.** Umbel 15-25-rayed; fruit oblong to ovate; carpels flattened laterally if at all. — (From the country Liguria where garden Lovage was first found.) **Ligusticum** (LOVAGE)
- DD.** Umbels 5-12-rayed; fruit oblong to linear; carpels slightly flattened dorsally if at all. — (Honor of George Washington, the first President.) **Washingtonia** (SWEET CICELY)
- CC.** Ribs of the carpels filiform or almost none. E. — (Gk. *eu* = well, *lophos* = a plume; apparently referring to the plumelike leaves.) **Eulophus bolanderi**
- AA.** Stylopodium flat or none.
- E.** Seed face sulcate or decidedly concave.
- F.** Carpels flattened dorsally. E. — (Gk. *aulos* = a tube, *sperma* = a seed; apparently from the many oil tubes in the fruit.) **Aulospermum glaucum**
- FF.** Carpels terete. — (Probably in honor of O. Drude, a European botanist; Gk. *phyton* = a plant.) **Drudeophytum**
- EE.** Seed face plane or but slightly concave.
- G.** All of the ribs of the carpels conspicuously winged.
- H.** Plant of the seashore, tomentose; wings of the carpels corky-thickened. W. — (Possibly Gk. *glenos* = a thing to stare at, because it is so woolly.) **Glehnia littoralis**

- HH.** Plants of mountains and plains, glabrous or merely pubescent; wings of the carpels thin.
- I.** Leaves pinnate; leaf segments wide, crowded, more or less confluent; flowers purple or pinkish. **E.** — (Gk. *phellos* = cork, *pteron* = wing; referring to the fruit-wings.) **Phellopterus purpurascens**
- II.** Leaves ternate and then pinnate; leaf segments linear, not crowded, more or less hard-tipped; flowers yellow or white. — (Gk. *pteryx* = a bird's wing; referring to the wide fruit-wings.) **Pteryxia**
- GG.** Ribs of the carpels not winged.
- J.** Stem leaves simple, entire, clasping or perfoliate. **E.** — (Gk. *bous* = an ox, *pleuron* = a rib; referring to the conspicuous leaf veins of some species.) **Bupleurum americanum** (THOROUGHWAX)
- JJ.** Stem leaves none or not as above.
- K.** Flowers yellow; carpel rib all filiform; plant without leafy stem. **C.** — (Gk. *hespera* = evening or western, *gennao* = to beget; a western genus.) **Hesperogenia stricklandi**
- KK.** Flowers white or greenish; at least the lateral carpel ribs corky.
- L.** Stem 3 dm. or less high; lateral carpel ribs thick and corky, the dorsal filiform. — (Gk. *oros* = a mountain, *gennao* = to beget; they are mountain plants.) **Orogenia**
- LL.** Stem 5 dm. or more high; all the carpel ribs corky and equally prominent.
- M.** Calyx teeth minute; fruit flattened laterally; leaves pinnate. **W. E.** — (Gk. *sion* = the name of some marsh plant.) **Sium cicutaefolium** (WATER PARSNIP)
- MM.** Calyx teeth none; fruit not or hardly flattened either way; leaves 2-3-terminate. **W.** — (Gk. *koilos* = hollow, *pleuron* = a rib; from the hollow fruit ribs.) **Coelopleurum**

CARUM (CARAWAY)

Glabrous, erect. Leaves pinnate; leaflets few. Flowers white; involucre and involucels present. Fruit flattened laterally, oblong to orbicular, glabrous; ribs filiform or inconspicuous; oil tubes large, 1 in each interval, 2-6 on the commissure side. — (From Caria, a country in Asia Minor, where first found.)

- A.** Even the upper leaves twice pinnate; fruit oblong, 4-5 mm. long. **W.** — Cultivated for the seed, as a spice. **C. carui** (GARDEN CARAWAY)
- AA.** At least the upper few leaves only once pinnate.
- B.** Fruit orbicular, 2 mm. long. **W. C. E.** **C. gairdneri**
- BB.** Fruit oblong, 3-4 mm. long.
- C.** Fruit rounded at both ends. **C. E.** **C. oreganum**
- CC.** Fruit narrowed at both ends. **U.** **C. lemmon**

DAUCUS (CARROT)

Annual or biennial. Flowers white; umbels compound. Calyx teeth obsolete. Fruit oblong, somewhat flattened dorsally; primary ribs 5, slender; secondary ribs 4, winged; oil tubes 1 in each interval, 2 on the commissure side. — (*Daukos* was the Greek name for the Carrot.)

A. Leaf segments narrowly linear. W. E. — Common weed in meadows.

D. pusillus (WILD CARROT)

AA. Leaf segments lanceolate. W. — Cultivated for its yellow edible root.

D. carota (CULTIVATED CARROT)

CORNACEAE (DOGWOOD FAMILY)

Herbs or shrubs or trees. *Leaves opposite*, mostly entire, *pinnately veined*; stipules none. Flowers in cymes or heads or ament-like clusters. Calyx limb 4-5-toothed or -lobed. Petals none or distinct, 4-5. Stamens 4, alternate with the petals. *Ovary inferior*, 1-2-celled; ovules 1-2; styles 1-2. *Fruit fleshy*, a drupelet or a berry.

A. Leaves deciduous, herbaceous; flowers perfect; petals present; fruit a drupe.

CORNUS (p. 168)

AA. Leaves evergreen, coriaceous; flowers dioecious; petals none; fruit a berry.

GARRYA (p. 168)

CORNUS (DOGWOOD)

Herbs or shrubs or trees. Leaves entire, sometimes apparently whorled. Flowers variously colored, in cymes or heads, often involucre with large white bracts. Calyx limb minutely 4-toothed. Petals 4. Ovary 2-celled; style 1. Drupe globose to oblong. Seeds 2. — (L. *cornu* = a horn; referring to the hardness of the wood.)

A. Flowers in loose cymes, white or cream-colored, not involucre; fruit white or blue.

B. Leaves 5-10 cm. long; calyx teeth prominent.

C. Cyme branches hairy; leaves loosely pubescent beneath. W. C.

C. occidentalis (WESTERN DOGWOOD)

CC. Cyme branches glabrous; leaves appressed-pubescent beneath. C. E.

C. stolonifera (RED-OSIER DOGWOOD)

BB. Leaves 2.5-5 cm. long, acute at both ends; calyx teeth minute. U.

C. glabrata

AA. Flowers in sessile umbels, yellowish, involucre; involucre bracts 4, 5-7 mm. long; fruit blue-black; shrub 3-4.5 m. high. U.

C. sessilis

AAA. Flowers in dense heads, greenish, involucre; involucre bracts 4-6; fruit red.

D. Plant 8-20 cm. high, herbaceous; involucre bracts 1-2 cm. long. W. C. E.

C. canadensis (BUNCHBERRY)

DD. Plant 10-20 m. high, shrub or tree; involucre bracts 4-8 cm. long. W. C.

C. nuttallii (FLOWERING DOGWOOD)

GARRYA (FEVER-BUSH)

Shrubs; bark greenish; branchlets 4-angled. Leaves entire or undulate. Flowers in ament-like clusters; clusters axillary, pendulous, solitary or in 3's between the bracts. Calyx of the sterile flowers 4-parted; ovary none. Calyx of the fertile flowers shortly 2-lobed or entire; stamens none; ovary 1-celled; styles 2. Berry blue or purple. Seeds 1-2. — (Honor of M. Garry, of the Hudson Bay Company.)

- A. Leaves mostly truncate or rounded at base, rounded or acute at apex, undulate, densely tomentose beneath. W. **G. elliptica**
- AA. Leaves acute at both ends, entire.
- B. Leaves 3.7–6.2 cm. long, glabrous or nearly so beneath. W. C. **G. fremontii** (BEAR BUSH)
- BB. Leaves 2.5–3.7 cm. long, densely white appressed-silky beneath. U. **G. buxifolia**

PYROLACEAE (WINTERGREEN FAMILY)

Herbs or shrubs, *low*, perennial. *Leaves none or evergreen and coriaceous*, simple, petioled. Flowers perfect, nearly regular, solitary or racemose or corymbose, variously colored. Calyx segments 4–5. Petals 4–5, nearly or quite distinct. Stamens twice as many as the petals; *anthers opening by pores or slits at one end*. Ovary superior, 4–5-celled; stigma 4–5-lobed or -crenate. Fruit a capsule, loculicidal, dehiscent. Seeds many, minute.

- A. Leaves opposite or whorled; flowers solitary or in corymbs or umbels.
- B. Flowers in corymbs or umbels; style very short; leaves on erect or ascending branches. **CHIMAPHILA** (p. 169)
- BB. Flowers solitary; style long; leaves much clustered at base. W. C. E. —
(Gk. *monos* = 1, *esis* = delight; referring to the single beautiful flower.)
Moneses uniflora (SINGLE BEAUTY)
- AA. Leaves basal and not showing opposite if so; flowers in racemes.

PYROLA (p. 169)

CHIMAPHILA (PIPSISSEWA)

Herbs or shrubs, 3 dm. or less high; stems decumbent. Leaves opposite or whorled, serrate. Flowers white or purplish. Calyx 5-cleft or -parted, persistent. Petals 5, nearly orbicular. Capsule erect, globose, 5-lobed, 5-celled; valve margins not woolly. — (Gk. *cheima* = winter, *phileo* = I love; because it is evergreen.)

- A. Leaves cuneate-ob lanceolate, not white-mottled; flowers usually more than 3. W. C. E. **C. umbellata**
- AA. Leaves ovate to oblong-lanceolate, often white-mottled; flowers 1–3. W. C. E. **C. menziesii** (SPOTTED PIPSISSEWA)

PYROLA (WINTERGREEN)

Herbs, glabrous, stoloniferous. Flowers nodding, on erect bracted scapes. Calyx 5-parted, persistent. Petals 5. Capsule subglobose, 5-lobed, 5-celled. — (Diminutive of L. *pyrus* = the pear-tree; from the similarity of the leaves.)

- A. Green leaves none or very rudimentary.
- B. Flowers red. W. C. E. **P. aphylla** (FALSE CORAL ROOT)
- BB. Flowers white. W. C. E. **P. picta** (VARIABLE WINTERGREEN)
- AA. Green leaves plainly present.
- C. Style curved downwards.
- D. Flowers white or greenish.

- E. Calyx lobes obtuse; flowers greenish; leaves orbicular or nearly so. W. C. E.
P. chlorantha (GREEN WINTERGREEN)
- EE. Calyx lobes acute; flowers white; leaves broadly ovate to spatulate-oblong.
 W. C. E. **P. picta** (VARIABLE WINTERGREEN)
- DD. Flowers red or pink.
- F. Leaves thin, dull, obtuse. W. C. E.
P. incarnata (ROUND-LEAVED WINTERGREEN)
- FF. Leaves coriaceous, shining, acute. W. C. E.
P. bracteata (PEAR-LEAVED WINTERGREEN)
- CC. Style straight.
- G. Leaves ovate; raceme 1-sided; style equaling or exceeding the petals. W. C. E.
P. secunda (1-SIDED WINTERGREEN)
- GG. Leaves orbicular; raceme not 1-sided; style shorter than the petals. W. C. E.
P. minor (SMALL WINTERGREEN)

MONOTROPACEAE (INDIAN PIPE FAMILY)

Herbs, leafless, fleshy, white to red or brown, without green.
 Flowers either terminal and solitary, or else in a terminal spicate or racemose or headlike cluster. Flowers regular, perfect. Sepals 2-6. Petals 3-6, rarely none. *Stamens 6-12, hypogynous; anthers opening by slits* (except *Sarcodes*). *Ovary superior, 4-6-lobed, 1-6-celled.*
Fruit a capsule, loculicidal, 2-6-valved. Seeds many, minute.

- A. Corolla none; flowers spicate. W. C. E. — (Gk. *allos* = another, *tropa* = a turn; because there are many reflexed flowers.) **Allotropia virgata**
- AA. Corolla of distinct petals; flowers solitary or racemose.
- B. Ovary 3-5-celled; disk 10-12-toothed.
- C. Stems 1-flowered; plant pure white; bracts entire. W. C. E. — (Gk. *monos* = 1, *tropa* = a turn; referring to the single reflexed flower.)
Monotropa uniflora (INDIAN PIPE)
- CC. Stems 3-20-flowered; plant yellowish or reddish; bracts erose to fimbriate.
HYPOPITYS (p. 171)
- BB. Ovary 1-celled; disk inconspicuous or none; bracts laciniate-toothed or fimbriate.
PLEURICOSPORA (p. 171)
- AAA. Corolla of united petals; flowers racemose or spicate or capitate.
- D. Flowers in a raceme or spike; sepals 5; ovary 5-celled, none of these centrally placed.
- E. Plant 3-9 dm. high; flowers rather distant, in a long and not densely scaly raceme; corolla globose ovate; corolla lobes recurved; anthers 2-awned on the back. W. C. E. — (Gk. *pteron* = a wing, *spora* = a seed; the seeds are winged.)
Pterospora andromedea (PINEDROPS)
- EE. Plant 1.5-3 dm. high; flowers in a short densely scaly raceme or spike; corolla campanulate; corolla lobes erect; anthers not awned. U. C. — (Gk. *sarkos* = flesh, *eidos* = like; the plant is fleshy.)
Sarcodes sanguinea (SNOW PLANT)
- DD. Flowers in a headlike cluster; sepals 2, bractlike; ovary 1-celled, but apparently of 1 cell with 4 others surrounding it. W. C. — (Gk. *hemi* = half, *tomos* = a cutting; probably because the calyx is split into 2 sepals.)
Hemitomes congestum (CONE PLANT)

HYPOPITYS (PINESAP)

Plants under conifers; stem simple to the inflorescence, leafy-bracted. Flowers racemose, reflexed. Sepals 3-5, deciduous. Petals 3-5, saccate at base. Stamens 6-10. — (Gk. *hypo* = under, *pitys* = a Fir tree; referring to the habitat.)

- A. Bracts ovate-lanceolate, entire or slightly erose. W. C. E. H. hypopitys
 AA. Upper bracts obovate to cuneate, erose or laciniately fimbriate. W. C. H. fimbriata

PLEURICOSPORA (FLOWERING FUNGUS)

Less than 3 dm. high, white or yellowish; scales fimbriate. Flowers white, in a short terminal raceme. Sepals 4-5, scalelike. Petals 4-5, similar to the sepals. Stamens 8 or 10; anthers linear, apiculate. Seeds ovate, smooth. — (Gk. *pleurikos* = pertaining to ribs, *spora* = seed. Not clear why.)

- A. Petals about 8 mm. or less long, little or not at all exceeding the sepals and bracts. P. fimbriolata
 C. P. longipetala
 AA. Petals about 12 mm. long, much exceeding the sepals and bracts. C.

ERICACEAE (HEATH FAMILY)

Shrubs or trees. Leaves simple; *stipules none.* Calyx 4-5-parted or -cleft. *Corolla* mostly *gamopetalous*, of segments as many as the calyx. *Stamens hypogynous*; anther cells opening by pores or slits; *pollen grains united into 4's.* Ovary superior in flower, often inferior in fruit, 2-5-celled; style 1. Fruit a capsule or berry or drupe.

- A. Leaves coriaceous, evergreen.
 B. Leaves opposite.
 C. Shrub of peat bogs; leaves not densely crowded, not imbricate, lanceolate to oval, 2-4 cm. long; flowers in terminal clusters; corolla saucer-shaped. W. C. E. — Poisonous to sheep. (Honor of P. Kalm, a Finnish botanist.)

Kalmia polifolia (SWAMP LAUREL)

- CC. Shrub of high mountains; leaves densely crowded, imbricate, almost scalelike, 2-4 mm. long; flowers solitary, axillary; corolla campanulate.

CASSIOPE (p. 173)

- BB. Leaves alternate.

- D. Leaves 4-15 mm. long, linear or oblong; shrubs low, matted, on high mountains.

- E. Flowers in terminal clusters, yellowish or rose-colored; anthers awnless.

PHYLLODOCE (p. 173)

- EE. Flowers terminal, solitary, white; anthers 2-awned. C. — (Honor of E. H. Harriman, an American financier.)

Harrimanella stelleriana (ALASKA HEATHER)

- DD.** Leaves either 2 cm. or more long, or else wider for their length; shrubs or trees, various in form and in the altitude of their habitat.
- F.** Leaves strongly revolute; fruit a dry capsule.
- G.** Leaves 7.5–15 cm. long; shrubs on dry soil; flowers rose-colored; corolla about 5 cm. long, campanulate. **RHODODENDRON** (p. 173)
- GG.** Leaves 3–7.5 cm. long; shrubs in peat bogs; flowers white; corolla less than 1 cm. long, either urn-shaped or of distinct petals.
- H.** Corolla gamopetalous, urn-shaped; anthers 2-awned; capsule loculicidal; leaves without hairs beneath. **C.** — (Andromeda was a mythological Greek beauty, the daughter of Cassiope.) **Andromeda polifolia** (BOG ROSEMARY)
- HH.** Corolla of separate petals; petals widely spreading; anthers awnless; capsule septicidal; leaves with or without hairs beneath. **LEDUM** (p. 172)
- FF.** Leaves not revolute; fruit a berry or drupe, fleshy.
- I.** Leaves entire, not over 7.5 cm. long; fruit red, 1–7-seeded. **ARCTOSTAPHYLOS** (p. 174)
- II.** Leaves serrulate or if entire 7.5–12.5 cm. long; fruit red or black, many-seeded.
- J.** Shrub; bark not red; calyx becoming large and fleshy; leaves either ovate to cordate or else not over 3.7 cm. long; flowers solitary or racemose, in the axils; berry red or black. **GAULTHERIA** (p. 173)
- JJ.** Shrub or tree; bark red; calyx remaining small; leaves oval or oblong and 7–12 cm. long; flowers paniculate, terminal; berry red. **W.** — The Trailing Arbutus of eastern U. S. goes to another genus, *Epigaea*. (The Latin name.) **Arbutus menziesii** (MADRONA)
- AA.** Leaves herbaceous, deciduous.
- K.** Corolla of separate petals, copper-colored; flowers solitary, the parts in 5's. **C.** — (Gk. *klados* = a branch, *thamnos* = a shrub; the branches are numerous.) **Cladothamnus pryolaeiflorus** (COPPER BUSH)
- KK.** Corolla gamopetalous, cylindric or urn-shaped or campanulate or funnel-form, not copper-colored; flowers clustered, the parts in 4's or 5's.
- L.** Flower parts in 4's; corolla 5 mm. or less long, urn-shaped or cylindric, greenish or purplish; ovary 4-celled. **W. C. E.** — (Honor of A. Menzies, surgeon and naturalist under Vancouver.) **Menziesia ferruginea** (FOOL'S HUCKLEBERRY)
- LL.** Flower parts in 5's; corolla 8–50 cm. long, campanulate or funnellform, white or cream-colored; ovary 5-celled. **RHODODENDRON** (p. 173)

LEDUM (LABRADOR TEA)

Shrubs, low. Leaves more or less resinous-dotted. Flowers fascicled; pedicels recurved in fruit. Calyx 5-lobed or -parted. Stamens 4–10; anther cells opening by terminal pores. Capsule oval or oblong, 5-valved from the base. Seed slender. — In peaty bogs. (Gk. *ledon* = the name of the Rock Rose, *Cistus*; from the resemblance.)

A. Leaves lanceolate; leaf margin revolute.

B. Leaves rusty-tomentose beneath. **W.**

BB. Leaves glaucous and not hairy beneath. **W.**

AA. Leaves oval or oblong, not hairy beneath; leaf margin not revolute. **E.**

L. groenlandicum

L. columbianum

L. glandulosum

RHODODENDRON

Leaves evergreen or deciduous, alternate, entire or nearly so. Flowers white or rose-colored or purple, large, in terminal umbels or lateral fascicles. Calyx 5-parted or -lobed. Corolla funnellform or campanulate, 5-lobed, regular or slightly 2-lipped. Stamens 5 or 10; anther cells opening by pores. Ovary 5-20-celled. Capsule 5-20-valved from tip. Seeds many, minute. — (Gk. *rhodon* = a rose; *dendron* = a tree; hence rose tree.)

A. Leaves thick, coriaceous, evergreen; corolla rose-colored. W. C.

R. californicum (RHODODENDRON)

AA. Leaves of ordinary thickness, not coriaceous, deciduous; corolla white or yellowish.

B. Leaves lanceolate or oblong; flowers in lateral clusters of 1-3; corolla 1.5-2 cm. long; stamens 10; capsule 6-8 mm. long. W. C. E. *R. albiflorum* (SMALL AZALEA)

BB. Leaves obovate-oblong; flowers in terminal umbels; corolla about 5 cm. long; stamens 5; capsule 16-25 mm. long. U. *R. occidentalis* (LARGE AZALEA)

PHYLLODOCE (HEATHER)

Low. Leaves crowded. Calyx 4-6-parted. Corolla campanulate or ovoid, 5-lobed. Stamens 10. Capsule 5-celled, globose to short-oblong, septicidal, 5-valved. Seeds many, minute. — (Phyllodoce was a sea-nymph mentioned by Virgil.)

A. Corolla red, campanulate. W. C. E.

P. empetriformis (RED HEATHER)

AA. Corolla yellowish, ovoid. W. C. E.

P. glanduliflora (YELLOW HEATHER)

CASSIOPE (MOSS HEATHER)

Low, matted. Leaves sessile, entire, apparently veinless, 4-ranked. Flowers peduncled, nodding, white or pink. Sepals 4 or 5. Corolla 4-5-lobed or -parted. Stamens 8 or 10; anther cells opening by pores, tipped with a recurved awn. Capsule globose or ovoid, 4-5-celled, 4-5-valved. Seeds many, minute. — (Cassiope was the mother of Andromeda.)

A. Leaves furrowed on the back. C.

C. tetragona

AA. Leaves keeled on the back. W. C. E.

C. mertensiana

GAULTHERIA

Leaves wide. Flowers small, nodding, either solitary in the leaf axils or in axillary racemes. Calyx 5-cleft or -lobed. Corolla urn-shaped to campanulate. Stamens 10; anther-cells opening by a pore at tip. Ovary 5-celled. Berry composed of the fleshy calyx inclosing the ovary. — (Honor of H. Gaulthier, a French naturalist, court physician at Quebec.)

A. Plant 3-30 dm. high; leaves 2.5-10 cm. long; corolla urn-shaped; filaments hairy; fruit black. W. C.

G. shallon (SALAL)

AA. Plant 0.5-2 dm. high; leaves 3.7 cm. or less long; corolla campanulate; filaments glabrous; fruit scarlet.

- B. Leaves broadly ovate or subcordate, 2-3.7 cm. long; corolla twice as long as the calyx lobes. W. C. E. G. ovatifolia
 BB. Leaves oval or rounded, 1-2 cm. long; corolla a little surpassing the calyx lobes. C. E. G. humifusa

ARCTOSTAPHYLOS (BEARBERRY)

Shrubs or small trees. Leaves wide, usually vertical by a twist of the petiole. Flowers small, white to light red, in racemes or panicles; clusters terminal. Calyx deeply 4-5-parted. Corolla urceolate. Stamens 8 or 10; anther cells with reflexed awns, opening by pores. Berry 4-10-celled. — (Gk. *arktos* = a bear, *staphyle* = a bunch of grapes; hence a bearberry.)

- A. Plant trailing or with branches erect or ascending; ovary and fruit glabrous (BEARBERRY OR KINNIKINNICK)
 B. Leaves obtuse or retuse; leaf blade widest above the middle, gradually tapering to the petiole. W. C. E. A. uva-ursi
 BB. Leaves cuspidate; leaf blade often widest below the middle, abruptly petioled. C. A. nevadensis
 AA. Plant erect; ovary and fruit glabrous or hairy. (MANZANITA.)
 C. Ovary glabrous; leaves glabrous.
 D. Leaves dark green; pedicels glabrous; twigs glandular.
 E. Bracts longer than the pedicels.
 F. Leaves acute at both ends. U. A. hispidula
 FF. Leaves obtuse at both ends. E. A. obtusifolia
 EE. Bracts shorter than the pedicels. U. A. manzanita
 DD. Leaves whitish-green; pedicels glandular or pubescent; twigs not glandular, glabrous or short hairy. U. A. viscida
 CC. Ovary hairy at the top; leaves glabrous, whitish-green; twigs ashy-gray; pedicels minutely hairy, longer than the bracts. U. A. cinerea
 CCC. Ovary densely pubescent or tomentose; leaves somewhat tomentose especially when young; pedicels glandular or hairy. W. C. A. tomentosa

VACCINIACEAE (HUCKLEBERRY FAMILY)

Shrubs, erect or trailing. Leaves alternate, simple, evergreen or deciduous. Flowers small, white or pink, perfect. Calyx 4-5-lobed to -divided. Corolla 4-5-lobed, or rarely of separate petals. *Stamens* 8 or 10, *epigynous* or on the base of the corolla; *anthers* often awned, *opening by pores*. *Ovary inferior*, 2-10-celled. Fruit a berry.

- A. Corolla segments less than half as long as the tube; plants erect or trailing, usually not in peat bogs; leaves deciduous or evergreen; berry red or black or blue. VACCINIUM (p. 175)
 AA. Corolla segments distinct nearly or quite to the base; plants trailing, in peat bogs only; leaves evergreen; berry red. W. C. — The cultivated cranberry is *V. macrocarpon*, which has a larger berry than ours. (Gk. *oxus* = sour, *kokkus* = a berry; the berries are somewhat acid.) Oxycoccus oxycoccus (CRANBERRY)

VACCINIUM (HUCKLEBERRY)

Flowers in racemes or clusters, rarely solitary in the leaf axils. Calyx persistent. Corolla urn-shaped to campanulate. Ovary 4-10-celled. Seeds many. — (L. *vacca* = a cow; perhaps because they are often pasture plants.) Fruits edible.

- A. Leaves deciduous; filaments glabrous; anthers 2-awned.
- B. Flowers solitary; corolla 5-lobed; calyx entire to 5-cleft; leaves often not entire; twigs often angled.
- C. Twigs terete; plants dwarf, caespitose, less than 5 dm. high; leaves mostly serrate.
- D. Leaves bright green on both sides, rather thin; corolla ovate or oblong. W. C. E.
- DD. Leaves pale and glaucescent, thicker; corolla globose. W. C. E.
- CC. Twigs slightly to sharply angled; plants 10-20 dm. high when twigs are only slightly angled.
- E. Leaves serrate or serrulate; plants 1-15 dm. high.
- F. Leaves 4-8 mm. long; berries red; plant 1-4.5 dm. high. C. E.
- FF. Leaves 12-16 mm. long; berries black; plant 1-3 dm. high. E.
- FFF. Leaves 25-50 mm. long; berries black; plant 3-15 dm. high. W. C. E.
- EE. Leaves entire or with a few irregular teeth; plants 10-40 dm. high.
- G. Leaves 6-17 mm. long; calyx 5-lobed; berry red. W. C. E.
- GG. Leaves 2.5-7.5 cm. long; calyx 10-toothed or -lobed; berry blue or black. W. C. E.
- BB. Flowers in clusters of 2-4; corolla usually 4-lobed; calyx 4-5-parted; leaves entire; twigs terete.
- H. Leaf veins prominent; leaves thick, obtuse or retuse. W. C. E.
- HH. Leaf veins obscure; leaves thinner, obtuse or acute. C. E. W. C. E.
- AA. Leaves evergreen, coriaceous; filaments hairy; anthers awnless.
- I. Plant erect; leaves acute, not revolute; berry black, not bitterish. W. C. E.
- II. Plant prostrate; leaves obtuse or emarginate, revolute; berry dark red, bitterish. C. E.

V. caespitosum (DWARF BILBERRY)

V. deliciosum (SWEET BILBERRY)

V. scoparium

V. oreophilum

V. membranaceum

V. parvifolium (RED HUCKLEBERRY)

V. ovalifolium

V. uliginosum (BOG BILBERRY)

V. occidentale

V. ovatum (EVERGREEN HUCKLEBERRY)

V. vitis-idaea (ROCK CRANBERRY)

PRIMULACEAE (PRIMROSE FAMILY)

Herbs. Leaves variously arranged. Flowers perfect, regular, variously arranged. Calyx 4-9-parted or -cleft. Corolla gamopetalous or none (*Glaux*), various in form, segments as many as the calyx. Stamens as many as the corolla lobes and opposite them, on base of corolla tube. Ovary superior or inferior (*Samolus*), 1-celled; placenta central; style 1. Capsules mostly 2-6-valved. Seeds 1 to many.

- A. Leaves opposite or whorled along elongated stems.
- B. Leaves sessile; flowers white or red or yellow.
- C. Flowers yellow; stem erect, 3-6 dm. high; leaves 2.5-5 cm. long, lanceolate.
C. E. — (Probably in honor of a Mr. Naumburg.)
Naumburgia thyrsoiflorus (TUFTED MONEYWORT)
- CC. Flowers white or red; stem decumbent or diffuse, 1-3 dm. high; leaves 0.6-2.5 cm. long, not lanceolate.
- D. Plants of salt marshes, perennial; stem terete, very little branched if at all; flowers white or pink; petals none. W. — (Gk. *glaukos* = sea-green, hence glaucous; referring to the color of the plant.)
Glaux maritima (BLACK SALTWORT)
- DD. Plants of cultivated ground, annual; stem 4-sided, much branched; flowers scarlet; petals present. W. — (Gk. *anagelao* = to laugh; it was supposed to counteract melancholia.) **Anagallis arvensis** (POORMAN'S-WEATHER GLASS)
- BB. Leaves petiolate; flowers yellow. **STEIRONEMA** (p. 177)
- AA. Leaves either alternate or else in a basal or terminal tuft or whorl.
- E. Leaves in a basal rosette.
- F. Corolla rotate, 4-5-parted; stamens often united into a cone about the pistil. **DODECATHEON** (p. 177)
- FF. Corolla salverform or funnelform, 5-lobed; stamens not united.
- G. Corolla-tube equaling or exceeding the calyx; plant perennial.
- H. Capsule many-seeded; stamens exserted. E. — (Diminutive of L. *primus* = first; because some blossom very early.)
Primula cusickiana (PRIMROSE)
- HH. Capsule 1-2-seeded; stamens included. **DOUGLASIA** (p. 176)
- GG. Corolla-tube shorter than calyx; plant annual. **ANDROSACE** (p. 177)
- EE. Leaves not all in a basal rosette, scattered along the stem or in a terminal whorl.
- I. Leaves or most of them 25 mm. or more long; flowers either not sessile or not solitary in the axils.
- J. Flowers few, terminal, not in racemes; stem simple; ovary superior; leaves tending to be in a terminal whorl; seeds few. **TRIENTALIS** (p. 177)
- JJ. Flowers many, in terminal paniced racemes; stem diffusely branched; ovary inferior; leaves all scattered along the stem; seeds many. E. — (Said to be from Celtic *san* = a greeting, *mos* = a pig; it was considered a cure for pig diseases.) **Samolus floribundus** (BROOKWEED)
- II. Leaves 4-6 mm. long; flowers sessile, solitary in the axils. C. E. — Diminutive of L. *cento* = a patch; probably referring to its manner of growth.)
Centunculus minimus (CHAFFWEED)

DOUGLASIA

Depressed, tufted. Calyx campanulate, 5-lobed, persistent. Corolla tube somewhat inflated above, its throat somewhat contracted and 5-arched beneath the sinuses. — (Honor of D. Douglas, a Scotch botanist and collector in our region.)

A. Leaves canescent with forked hairs, 8-12 mm. long. C. E.

D. *dentata*

AA. Leaves glabrous or nearly so, 4-6 mm. long. W. C.

D. *laevigata*

ANDROSACE

Flowers white or pink. Calyx persistent, 5-lobed or -parted. Stamens included. — (Gk. *andros* = a man, *sakos* = a buckler or shield; probably referring to the form of the leaves.)

- A. Leaves lanceolate or oblong-lanceolate, often toothed, 12-25 mm. long; calyx tube white to reddish; calyx segments subulate; capsule shorter than the calyx. E.
A. septentrionalis
- AA. Leaves ovate, entire, 3-5 mm. long; calyx tube green; calyx segments triangular; capsule much longer than the calyx. W. E.
A. filiformis

STEIRONEMA

Perennial; stems leafy. Flowers axillary. Corolla rotate, deeply 5-parted; sinuses rounded; segments ovate, cuspidate-pointed, each rolled about its stamen. Stamens alternating with 5 sterile filaments. Capsule 10-20-seeded. — (Gk. *steiros* = sterile, *nema* = a thread; referring to abortive stamens.)

- A. Leaves ovate-lanceolate to oblong-ovate, minutely ciliate; corolla lobes nearly twice as long as the calyx. C. E.
S. ciliatum
- AA. Leaves lanceolate to linear-lanceolate, not ciliate; corolla lobes but little longer than the calyx. U.
S. laevigatum

TRIENTALIS (STAR FLOWER)

Perennial, glabrous; stem 2.5-15 cm. high, from a tuber. Leaves simple, alternate but mostly clustered at the top. Flowers white or pink; pedicels filiform. Corolla completely rotate; segments 5-7, almost separate. — (L. *trientalis* = pertaining to a third; because they are about $\frac{1}{3}$ foot high.)

- A. Leaves crowded near the stem tip; woods plant; pedicels shorter than the leaves.
W. C. E. *T. latifolia*
- AA. Leaves scattered along the stem; bog plant; pedicels longer than the leaves.
W. C. E. *T. arctica*

DODECATHEON (SHOOTING STAR)

Perennial, low. Leaves entire to dentate. Flowers in an umbel on a naked scape. Calyx deeply 4-5-lobed; lobes reflexed in flower, erect in fruit. Corolla segments long, narrow, reflexed. Seeds many. — (Gk. *dodeka* = 12, *theos* = god; the name of the Primrose, which the 12 superior gods were thought to protect.)

- A. Flower parts normally in 4's. C. E. *D. tetrandrum*
- AA. Flower parts normally in 5's.
- B. Herbage glabrous.
- C. Leaves entire.
- D. Filaments free or anthers sessile.
- E. Leaves broadly elliptic to obovate. W. *D. latifolium* (MOSQUITO-BILLS)
- EE. Leaves narrower.
- F. Leaves 2-5 cm. long; scape 0.7-1.5 dm. long. E. *D. campestre*

- FF. Leaves 5-12 cm. long; scape 1-2 dm. long. C. E. D. conjugens
 FFF. Leaves 20-30 cm. long; scape 4-6 dm. long. E. D. dispar
 DD. Filaments united into a tube at least $\frac{1}{2}$ as long as the anthers.
 G. Filaments black; capsule opening by a lid. C. D. alpinum
 GG. Filaments yellow; capsule opening by valves from the tip.
 H. Involucre bracts oblong to spatulate; anthers about equaling the stamen tube; capsule splitting into halves. E. D. salinum
 HH. Involucre bracts lanceolate; anthers at least twice as long as the stamen tube; capsule opening by 5 short teeth. W. E. D. pauciflorum
 CC. Leaves not entire.
 I. Leaves dentate, ovate; petals white, each with 2 purple spots at base; capsule opening by valves from the tip. C. E. D. dentatum
 II. Leaves crenate, longer for their width; petals purple throughout; capsule opening by a lid. W. C. E. D. jeffreyi
 BB. Herbage puberulent or viscid-puberulent.
 J. Filaments yellow, united into a tube; capsule opening by valves from the tip. E. D. cusickii
 JJ. Filaments black, not united; capsule opening by a lid. E. D. viscidum

PLUMBAGINACEAE (LEADWORT FAMILY)

Herbs, perennial. *Leaves basal* and tufted, 1-veined, fleshy, linear, entire. *Flowers perfect*, regular, in heads. *Calyx tubular* or funnellform, 5-toothed; tube 10-ribbed. *Petals 5*, distinct or nearly so. *Stamens 5*, opposite the petals, hypogynous. *Ovary superior*, 1-celled; styles 5, united at base. *Fruit a utricle*. *Seed 1*. W. — (Gk. *statizo* = to stop; thought to cure diarrhoea.)

Statice armeria (THRIFT)

OLEACEAE (OLIVE FAMILY)

Trees. *Leaves opposite, odd-pinnate; leaflets 5-7, entire; stipules none*. *Flowers regular*; dioecious, fascicled. *Calyx small*, 4-cleft. *Corolla none*. *Stamens 2-4*. *Ovary superior*, 2-celled. *Fruit a samara*, 1-winged. W. C. E. — (Gk. *phraxis* = a separation; because the wood splits easily.)

Fraxinus oregana (OREGON ASH)

GENTIANACEAE (GENTIAN FAMILY)

Herbs, bitter. *Leaves opposite, or rarely whorled or alternate, entire or nearly so; stipules none*. *Flowers regular*, perfect, variously arranged. *Calyx persistent* 4-12-toothed or -divided. *Corolla gamopetalous*; lobes as many as the sepals. *Stamens as many as corolla lobes, alternate with them*, on the tube or throat. *Ovary superior*, 1-celled or partly 2-celled; style 0-1; stigmas 1-2. *Seeds many*.

A. Flowers yellow, the parts in 4's. U. — (Gk. *mikros* = small, *kalos* = beautiful; hence a small beauty.) **Microcala quadrangularis**

AA. Flowers either not yellow or else the parts in 5's.

B. Corolla longer than rotate.

C. Style filiform, deciduous; anthers twisted when old. **CENTAURIUM** (p. 179)

CC. Style short and persistent or none; anthers not twisted when old.

GENTIANA (p. 179)

BB. Corolla rotate.

D. Style very short or none; flower parts in 5's. E. — (Honor of E. Swert, a Dutch bulb grower.) E. **Swertia palustris** (CHIRETTA)

DD. Style slender, long; flower parts in 4's.

FRASERA (p. 180)

CENTAURIUM (CENTAURY)

Low. Leaves entire, sessile. Flowers pink or white, in cymes or spikes. Calyx tubular; segments 4-5, narrow, keeled. Corolla salverform. Stigma 2-lobed. — (L. *centum* = 100, *aurum* = gold or gold pieces; referring to the medicinal value.)

A. Stem 2.5-5 cm. high; leaves 2-6 mm. long, lanceolate. W. **C. minimum**

AA. Stem more than 5 cm. high; leaves more than 6 mm. long, not lanceolate.

B. Basal leaves in a rosette. W.

C. umbellatum (BITTER HERB)

BB. Basal leaves not in a rosette.

C. Corolla lobes obtuse or retuse; pedicels mostly shorter than the flowers. W. E.

C. mühlenbergii

CC. Corolla lobes obtuse or acute; pedicels much longer than the flowers.

D. Corolla lobes obtuse; seed globose. C. E. **C. exaltatum** (TALL CENTAURY)

DD. Corolla lobes acute; seed oblong. E.

C. nuttallii

GENTIANA (GENTIAN)

Erect. Leaves opposite or whorled, entire. Flowers variously colored. Calyx tubular, 4-7-cleft. Corolla various in form. Stigma cleft into 2 lamellae. — (Honor of King Gentius of Illyria, who is said to have discovered the medicinal value.)

A. Corolla plicate in the sinuses, the folds more or less extended into thin teeth; perennial.

B. Corolla yellow; perennial by offsets; anthers introrse. W.

G. douglasiana (YELLOW GENTIAN)

BB. Corolla white or blue; root perennial; anthers extrorse.

C. Stem leaves 2-4 pairs; stems 2-10 cm. long. C.

G. newberryi (DWARF GENTIAN)

CC. Stem leaves 6 to many pairs; stems 15 cm. or more long.

D. Upper leaves forming an involucre about the 1-5-flowered cluster.

E. Flower 1. W. C. E.

G. calycosa

EE. Flowers 1-5. W. C. E.

G. parryi

DD. Upper leaves not forming an involucre.

F. Corolla oblong-campanulate, its lobes narrowed at base, its appendages entire. G. Plant 3-6 dm. high; leaves lanceolate to linear, 3-veined; seed unappendaged. U.

G. menziesii

GG. Plant 6-12 dm. high; leaves ovate to lanceolate, 3-7-veined; seed with acuminate appendage. W.

G. septentrionalis

FF. Corolla funnelform, its lobes not narrowed at base, its appendages laciniate-toothed or -cleft.

H. Stem 2-3 dm. high; leaves oblong to linear; bracts lanceolate to linear; calyx lobes linear to narrowly lanceolate; corolla 2-2.5 cm. long. E.

G. affinis

HH. Stem 3-6 dm. high; leaves ovate to oblong; bracts oblong to ovate; calyx lobes oblong to ovate-lanceolate; corolla 3-3.5 cm. long. E.

G. oregana

AA. Corolla without teeth or lobes or extended plaits in the sinuses; annual.

I. Corolla 25-50 mm. long, its lobes often fimbriate or erose.

J. Calyx lobes acutely keeled, 2 larger and narrower. E.

G. serrata

JJ. Calyx lobes not keeled, all about equal. C.

G. simplex

II. Corolla 5-7 mm. long, its lobes entire.

K. Leaves 4-12 mm. long; calyx lobes ovate to oblong; corolla 5-8 mm. long. E.

G. tenella

KK. Leaves 12-50 mm. long; calyx lobes lanceolate to linear; corolla 10-17 mm. long. W. C. E.

G. acuta

FRASERA (COLUMBO)

Leaves opposite or whorled. Flowers many, clustered. Corolla 4-parted. Stamens on the very base of the corolla. Capsule ovate. — (Honor of John Fraser, an American plant collector.)

A. Leaves with firm white border.

B. Whole plant puberulent; corolla lobes acuminate. E.

F. albicualis

BB. Whole plant glabrous; corolla lobes obtuse or acute. E.

F. nitida

AA. Leaves not bordered.

C. Leaves in whorls of 2 or 3; corolla blue-purple; capsule flattened parallel to the partition; seed globose. E.

F. fastigiata

CC. Leaves in whorls of 4 or 6; corolla greenish; capsule flattened perpendicular to the partition; seed oblong. E.

F. speciosa

MENYANTHACEAE (BUCKBEAN FAMILY)

Herbs, perennial, aquatic or in marshes; rhizome creeping. Leaves basal or alternate, glabrous, crenate or 3-foliolate. Flowers clustered, regular, perfect. Calyx deeply 5-parted, persistent. Corolla funnelform to rotate, 5-lobed or -cleft. Stamens 5, on the corolla, alternate with the corolla lobes. Ovary superior or half-superior, 1-celled. Fruit a capsule, oval. Seeds few, flattish, smooth.

A. Leaves simple; corolla lobes entire; style short or none. W. — (Gk. *nephros* = the kidneys, *phyllon* = a leaf, *idios* = peculiar; hence a peculiar kidney-shaped leaf.)

Nephrophyllidium crista-galli (DEER CABBAGE)

AA. Leaves 3-foliolate; corolla lobes fimbriate; style subulate. W. C. E. — (Gk. *mene* = a month, *anthos* = a flower.)

Menyanthes trifoliata (BUCKBEAN)

APOCYNACEAE (DOGBANE FAMILY)

Herbs, perennial; *juice milky*. *Leaves* simple, entire, *opposite*; stipules none. Flowers perfect, regular, the parts in 5's. Calyx persistent. Corolla gamopetalous, lobed. Stamens on the corolla, as many as its lobes, alternate with them. *Carpels* 2, *distinct*, superior, adherent to the calyx at base; ovules many. Fruit of 2 follicles. *Seed bearded*. — Only the following genus.

APOCYNUM (DOGBANE)

Anthers united around the stigma. — (Gk. *apo* = from, *kyon* = a dog; some species are said to be poisonous to dogs.)

- A. Leaves oval to orbicular; corolla lobes spreading or recurved.
- B. Leaves glabrous. W. E. A. *androsaemifolium* (SPREADING DOGBANE)
- BB. Leaves puberulent. E. A. *detonsum*
- AA. Leaves oval to lanceolate; corolla lobes erect.
- C. Calyx and bracts ciliolate. E. A. *ciliolatum*
- CC. Calyx and bracts entire, not ciliolate.
- D. Cymes large, many-flowered. E. A. *cannabinum* (INDIAN HEMP)
- DD. Cymes small, few-flowered. E. A. *suksdorfii*

ASCLEPIADACEAE (MILKWEED FAMILY)

Herbs, perennial; juice milky. *Leaves opposite or whorled*; stipules none. Flowers regular, perfect, in umbels. Calyx segments 5. Corolla rotate to funnelform, 5-lobed or -cleft. *Crown between stamens and corolla* 5-lobed or -parted. Stamens 5, on corolla near base; filaments monadelphous; anthers united around the stigma. *Carpels* 2, *superior, their ovaries and styles distinct*, their stigmas united into a head. Fruit of 2-follicles. *Seeds many, flattish, long-bearded*.

- A. Leaves cordate-clasping at base; hoods of the crown between stamens and corolla without horns inside. U. — (Gk. *a* = without, *kerates* = horns; they lack the stamen horns of *Asclepias*.) A. *acerates cordifolia* (GREEN MILKWEED)
- AA. Leaves not clasping; hoods of the crown between stamens and corolla each with a horn inside. ASCLEPIAS (p. 181)

ASCLEPIAS (MILKWEED)

Leaves entire. — (The Greek name of the god of healing; some of the plants are medicinal.)

- A. Leaves white-tomentose; stem 6-18 dm. high; leaves oval to oblong. E. A. *speciosa* (WOOLLY MILKWEED)
- AA. Leaves glabrous; either the stem only 1.5-3 dm. high or else the leaves linear to lanceolate.

B. Leaves many, in whorls of 2-6, linear to lanceolate, 7.5-15 cm. long; corolla lobes 4 mm. long. W. E. **A. mexicana** (WHORLED MILKWEED)

BB. Leaves 6-8, opposite, rounded-ovate, 2.5-5 cm. long; corolla lobes 10 mm. long. E. **A. cryptoceras** (DWARF MILKWEED)

CONVOLVULACEAE (MORNING-GLORY FAMILY)

Herbs. Stems prostrate or twining. Leaves none or mere scales, alternate; stipules none. Flowers axillary, regular, the parts in 4's or 5's. Sepals persistent. Corolla limb entire or lobed. Stamens as many as the corolla segments and alternate with them. Ovary 2-6-celled; cells 1-2-ovuled; styles 1 or 2 or 4. Fruit a capsule or sometimes fleshy. Seed large.

A. Plants green, not parasitic; leaves ordinary, wide. **CONVOLVULUS** (p. 182)

AA. Plants red or yellow, without green, parasitic; leaves mere scales.

CUSCUTA (p. 182)

CONVOLVULUS (BINDWEED)

Corolla campanulate to funnelform, somewhat 5-lobed or -angled at margin. Stamens included. Capsule globose, 2-celled. Seeds usually 2. — (*L. convolvere* = to entwine; they are twining plants.)

A. Peduncles with 2 bracts just beneath the calyx and reaching or inclosing it; stigmas linear to ovate.

B. Leaves somewhat cuneate at base; basal leaf-lobes small or none. W.

C. californicus

BB. Leaves not at all cuneate at base.

C. Leaves reniform, entire or with obscure angles, fleshy; stem trailing or creeping. W.

C. soldanella (FLESHY BINDWEED)

CC. Leaves not reniform, distinctly angled, not fleshy; stem mostly twining.

D. Leaf lobes at base entire; peduncles often 2-flowered. W. **C. occidentalis**

DD. Leaf lobes at base from entire to 2-3-lobed; peduncles all 1-flowered. E.

C. sepium (HEDGE BINDWEED)

AA. Peduncles without bracts near the calyx, but often with them farther down; stigmas filiform. W. E.

C. arvensis (FIELD BINDWEED)

CUSCUTA (DODDER)

Flowers small, whitish, in cymose clusters. Calyx 4-5-parted or -cleft. Stamens in throat of corolla. Ovary globose, 2-celled. Seeds 1-4. — (The Latin name.) Those growing on crop plants are bad weeds.

A. Corolla scales fringed; stigmas capitate.

B. Capsule pointed.

C. Flowers with pedicels; dry corolla enveloping the capsule; in fields and waste places. E.

C. indecora (PRETTY DODDER)

CC. Flowers sessile; dry corolla not enveloping the capsule; in salt marshes along the coast. W.

C. squamigera (SALT-MARSH DODDER)

BB. Capsule globose.

D. Flowers sessile; style shorter than ovary. E. **C. arvensis** (FIELD DODDER)

DD. Flowers with pedicels; style as long or longer than the ovary.

E. Stems coarse; calyx-lobes obtuse; corolla lobes obtuse or rounded. E.

C. *cephalanthi* (SAGE DODDER)

EE. Stems fine; calyx lobes acute; corolla lobes lanceolate-subulate. C. E.

C. *californica*

AA. Corolla scales crenulate; stigmas filiform.

F. Calyx lobes not keeled; corolla lobes triangular, acute. W.

C. *epithymum* (ALFALFA DODDER)

FF. Calyx lobes keeled; corolla lobes ovate, obtuse. E.

C. *planiflora*

POLEMONIACEAE (PHLOX FAMILY)

Herbs or shrubs. Stipules none. *Flowers* perfect, *regular*; calyx 5-lobed to -parted, persistent. Corolla 5-lobed. Stamens 5, distinct, in the corolla tube, alternate with the corolla lobes. Ovary superior; *style* 1, 3-lobed or -cleft. Fruit a *capsule*, 3-celled, loculicidal. Seeds small. — Several genera are too difficult for beginners. (F. & R. pp. 311-316.)

A. Calyx distended and at length burst by the capsule; leaves opposite or alternate.

B. Leaves opposite, entire; plant perennial; corolla salverform. PHLOX (p. 183)

BB. Not as above in all of the first 3 points; corolla often not salverform.

GILIA (p. 183)

AA. Calyx not distended nor burst by the capsule; leaves alternate.

C. Calyx teeth spine-tipped; leaves compound; stamens inserted at unequal heights in the corolla-tube.

NAVARRETIA (p. 183)

CC. Calyx teeth herbaceous, not spine-tipped.

D. Leaves compound, pinnate; leaflets entire (except *P. confertum*); stamens inserted equally high in the corolla tube; corolla rotate to funnelform.

POLEMONIUM (p. 184)

DD. Leaves simple, entire or pinnately or palmately dissected; stamens inserted at unequal heights in the corolla tube; corolla salverform to funnelform.

COLLOMIA (p. 184)

PHLOX (PHLOX)

Herbs. Leaves opposite or some of the upper ones alternate. Flowers large. Calyx 5-ribbed. — (Gk. *phlox* = flame; the name of some flame-colored flower.)

GILIA (GILIA)

Herbs or shrubs. Leaves opposite or alternate. Corolla funnelform or tubular or campanulate or salverform. — (Honor of F. Gil, a Spanish botanist.)

NAVARRETIA (NAVARRETIA)

Herbs, annual, low. Flowers small, in headlike clusters; clusters leafy-bracted. Calyx tube with five prominent great angles or veins, scarious between the angles; lobes unequal. Corolla tubular-funnelform to salverform. — (Honor of Navarrete, a Spanish physician.)

- A. Leaves 1-pinnatifid or -incised, or many leaves entire.
 B. Stem not viscid, slender, 2.5-15 cm. high; leaves all slender and filiform except the bracts of the head. E. *N. divaricata*
 BB. Stem very viscid, stout, rigid, 15-18 cm. high; leaves of the stem mostly lacinate-pinnatifid. U. *N. atractyloides*
 AA. Some of the leaves and bracts more than 1-pinnatifid or -incised.
 C. Plant with skunklike odor, glandular-viscid. W. *N. squarrosa* (SKUNKWEED)
 CC. Plant without skunklike odor, not glandular, not viscid (except *N. breweri*).
 D. Corolla yellow; plant somewhat glandular-viscid. U. E. *N. breweri*
 DD. Corolla white or blue; plant not glandular-viscid.
 E. Corolla pale blue; leaf-divisions all spinose. U. *N. stricta*
 EE. Corolla white.
 F. Stem glabrous or glabrate except at the very top; ovules 1-3 in each cell.
 G. Plant 2.5-7.5 cm. high; bracts of the head with spinose lobes. C. *N. minima*
 GG. Plant 10-25 cm. high; bracts of the head with barely sharp-pointed lobes. U. *N. leucocephala*
 FF. Stem puberulent or pubescent.
 H. Ovules 3-4 in each cell; stem pubescent; calyx tube and base of bracts very hairy. E. *N. intertexta*
 HH. Ovule 1 in each cell; stem puberulent; calyx tube and bracts sparsely hairy. E. *N. klickitatensis*

COLLOMIA (COLLOMIA)

Herbs. Flowers white or yellow or purple. Calyx obpyramidal, scarious in the sinuses; lobes erect, entire. — (Gk. *kolla* = glue; referring to the glutinous seeds when wet.)

- A. Leaves or at least the lower ones more or less dissected.
 B. Calyx lobes triangular- to ovate-lanceolate.
 C. Leaves pinnately veined; annual. W. C. *C. heterophylla*
 CC. Leaves palmately veined; perennial. C. *C. debilis*
 BB. Calyx lobes subulate; perennial.
 D. Stems loosely branching, often more than one from the same root; inflorescence loose. U. *C. glutinosa*
 DD. Stems usually simple but mostly several from the same root; inflorescence dense, headlike. C. *C. mazama*
 AA. Leaves entire or at most merely serrate.
 E. Flowers solitary in the axils. E. *C. tenella*
 EE. Flowers in clusters.
 F. Corolla pink, 1 cm. long.
 G. Calyx lobes aristate; flowers few in a cluster. C. E. *C. aristella*
 GG. Calyx lobes acute; flowers many in a cluster. E. *C. linearis*
 FF. Corolla salmon-colored, 2-3 cm. long. W. C. E. *C. grandiflora*

POLEMONIUM (GREEK VALERIAN)

Herbs. Flowers clustered. Calyx not angled, not ribbed, campanulate or narrower, cleft to the middle; lobes equal, erect to spreading. Corolla regular. — (Gk. *polemos* = war; it is said that two kings fought over the honor of the discovery of the medicinal uses.)

- A. Corolla yellow, 16-20 mm. long, its lobes 3-4 times as long as its tube; plant 1.5-4.5 dm. high. C. *P. luteum*

- AA.** Corolla white or cream-colored or blue or salmon-colored, various in length and in lobing.
- B.** Leaflets 2-3-divided and thus appearing in fascicles or whorls, 2-6 mm. long.
C. E. **P. confertum**
- BB.** Leaflets entire, not as if fascicled, usually longer.
- C.** Leaflets 2-12 mm. long; stem 5-30 cm. high.
- D.** Corolla white, nearly rotate; our only annual species. E. **P. micranthum**
- DD.** Corolla blue, campanulate; perennial.
- E.** Flower violet with a yellow eye. C. E. **P. elegans**
- EE.** Flower pale blue or purplish or white, without eye.
- FF.** Plants densely caespitose, 5-10 cm. high; leaflets 30-40 C. **P. viscosum**
- FF.** Plants loosely caespitose, 15-30 cm. high; leaflets 9-21. W. C. E. **P. humile**
- CC.** Leaflets 12-35 mm. or more long; stems often over 30 cm. high.
- G.** Corolla salmon- or flesh-colored, 25-37 cm. wide. U. **P. carneum**
- GG.** Corolla white or cream-colored or blue, less than 25 cm. wide.
- H.** Stems 6-9 dm. high; seeds 6-13 in each cell.
- I.** Leaflets oblong-ovate. C. E. **P. occidentale**
- II.** Leaflets linear. E. **P. pectinatum**
- HH.** Stems 1.5-5 dm. high; seeds 3-4 in each cell. W. **P. amoenum**

HYDROPHYLLACEAE (WATER-LEAF FAMILY)

Herbs or rarely shrubs, stipules none. *Flowers* various, mostly in *scorpid* bractless clusters. Sepals 5, distinct or nearly so. *Corolla regular*, 5-lobed, rotate to salverform. *Stamens* 5, alternate with the corolla lobes, on base of corolla. *Ovary superior*; styles 1-2. Fruit a capsule, 1-2-celled, 2-4-valved. Seeds 2 to many.

- A.** Herbs, not evergreen; leaves without balsamic resin.
- B.** Stems elongated, leafy; flowers either not solitary or else not on basal peduncles.
- C.** Flowers grouped in bractless inflorescences; stems and leaves often unlike those in CC.
- D.** Style 2-lobed or -cleft at apex; leaves rarely reniform; stems leafy.
- E.** Corolla convolute in the bud; placentae wide.
- F.** Annual; stamens included; ovules 4-20. **NEMOPHILA** (p. 186)
- FF.** Perennial; stamens exserted; ovules 4. **HYDROPHYLLUM** (p. 187)
- EE.** Corolla imbricate in the bud; placentae narrow.
- G.** Corolla deciduous, rarely yellowish and then the stamens exserted; stamens unequally inserted in the corolla. **PHACELIA** (p. 186)
- GG.** Corolla persistent, yellow or yellowish; stamens included, equally inserted at the very base of the corolla. **EMMENANTHE** (p. 186)
- DD.** Style and even the stigma entire; leaves round-reniform, 25 mm. or less wide; stems almost leafless. W. C. — (Honor of M. Romanzoff, a Russian nobleman who sent Kotzebue to Alaska.) **Romanzoffia sitchensis**
- CC.** Flowers solitary in the leaf-axils; stems 5-10 cm. long, dichotomously branched; leaves entire, linear-spatulate, 1-3 cm. long.
- H.** Styles 2, distinct to the ovary. E. — (Gk. *nama* = a stream; probably referring to the habitat.) **Nama demissum**

HH. Style 1, 2-cleft at the apex.

CONANTHUS (p. 187)

BB. Acaulescent; leaves all basal; flowers solitary on basal peduncles.

CAPNOREA (p. 187)

AA. Shrubs, evergreen, glabrous, 9-15 dm. high; leaves glutinous with a balsamic resin, lanceolate, entire or serrate, 7.5-15 cm. long. E. — (Gk. *erion* = wool, *diktyon* = a net; from the hairy and reticulate-veiny under side of the leaves.)

Eriodictyon glutinosum (YERBA SANTA)

EMMENANTHE (WHISPERING BELLS)

Low, annual. Leaves alternate. Flowers in simple or circinate racemes. Corolla campanulate. Capsule ovoid or oblong, flattish, incompletely 2-celled. Seeds 2 to many. — (Gk. *emmenos* = a month, *anthos* = a flower; said to be because the corolla is persistent.)

A. Leaves entire or nearly so; corolla nearly white, without appendages inside. E.

E. pusilla

AA. Leaves deeply lobed or pinnatifid; corolla bright yellow, with 10 appendages inside.

B. Style much longer than the ovary; ovules about 11; seeds 8-10; calyx lobes linear. E.

E. lutea

BB. Style hardly longer than the ovary; ovules 20-40; seeds 15-20; calyx lobes linear-spatulate. E.

E. parviflora

PHACELIA (PHACELIA)

Leaves alternate. Flowers in somewhat scorpioid clusters, blue or purple or white or yellowish. Corolla tube rotate to tubular. Placentae 2, parietal; style 2-cleft or -parted. Capsule 1-celled or nearly 2-celled. Seeds 2 to many. — (Gk. *fakelos* = a fascicle; referring to the flower bunches.) Species too difficult for beginners. (F. & R. pp. 317-319.)

NEMOPHILA (GROVE LOVER)

Leaves opposite or alternate. Calyx with appendage in each sinus, enlarged in fruit. Corolla rotate to tubular. — (Gk. *nemos* = a grove, *phileo* = I love; from the shady habitat.)

A. Corolla rotate, white or light blue, speckled with dark blue; leaves opposite. W.

N. menziesii

AA. Corolla campanulate to tubular, white or bluish, not speckled; leaves opposite or alternate.

B. Leaves mostly opposite; corolla equaling the calyx, white or bluish.

C. Corolla bluish, twice as long as the calyx; calyx lobes subulate. W. C.

N. sepulta

CC. Corolla white, less than twice as long as the calyx; calyx lobes lanceolate or wider.

D. Leaves oblong; seeds mostly 6-8. E.

N. pedunculata

DD. Leaves ovate; seeds mostly 4. W. C. E.

N. parviflora

BB. Leaves mostly alternate; corolla shorter than calyx, white. E. N. breviflora

HYDROPHYLLUM (WATER-LEAF)

Leaves alternate, petioled, pinnately lobed or divided. Flowers on long naked peduncles, in terminal scorpioid clusters. Calyx without appendages at the sinuses. Corolla campanulate, with appendages inside. Filaments bearded at the middle. Seeds 1-4. — (Gk. *hydro* = water, *phyllon* = a leaf; it was supposed that each leaf had a water cavity.)

- A. Flowers in a dense head; peduncle shorter than the petiole; leaf lobes obtuse. E. H. capitatum
- AA. Flowers in a loose head or a cyme; peduncle longer than the petiole.
- B. Basal leaves 3-5-parted; calyx lobes glabrous on the back, ciliate with stiff hairs; leaf-lobes mostly acute. W. H. tenuipes
- BB. Basal leaves 5-15-parted; calyx lobes pubescent on the back, ciliate with long soft hairs.
- C. Leaf lobes obtuse. U. C. H. occidentale
- CC. Leaf lobes acute.
- D. Plant 4-6 cm. high. C. E. H. albifrons
- DD. Plant 20-40 cm. high. E. H. fendleri

CAPNOREA

Leaves entire, spatulate or oblong. Calyx 5-7-parted. Corolla campanulate to saucer-shaped. Style 2-cleft. Capsule loculicidal. Seeds 15-20, large. — (Gk. *kapnos* = smoke; apparently from the smoke-colored leaves.)

- A. Corolla saucer-shaped.
- B. Leaves pubescent beneath.
- C. Pubescence appressed. E. C. villosula
- CC. Pubescence not appressed. E. C. hirtella
- BB. Leaves glabrous except on the margin.
- D. Calyx lobes very unequal. E. C. fulcrata
- DD. Calyx lobes almost equal. E. C. pumila
- AA. Corolla campanulate. E. C. nana

CONANTHUS

Annual. Leaves alternate. Calyx sinuses without appendages. Corolla tubular-funnelform, without appendages inside. Stamens included. Seeds 10-20. — (Gk. *konos* = a cone, *anthos* = a flower; probably referring to the form of the corolla.)

- A. Corolla 5 mm. or less long. E. C. parviflora
- AA. Corolla 6 mm. or more long. E. C. aretioides

BORAGINACEAE (BORAGE FAMILY)

Herbs, annual or perennial. Leaves alternate, rarely opposite or whorled, mostly entire, hairy; stipules none. Flowers perfect, mostly blue, mostly in 1-sided scorpioid spikes or racemes or cymes.

Corolla sympetalous, 5-lobed. Stamens as many as the corolla lobes and alternate with them, on the corolla. *Ovary superior, usually of 2 or 4 somewhat globose lobes with a common style from between them*; ovules 4; style entire to 2-parted. Fruit of two 2-seeded carpels or of four 1-seeded nutlets. — Difficult family; keys largely based upon mature fruit. Keys to species mostly omitted. (F. & R. pp. 321-330.)

A. Ovary undivided, sometimes 2-4-grooved; style at tip of ovary.

B. Plant hairy, prostrate, annual; leaves ovate to rounded, 4-8 mm. long; style 2-cleft or -parted. E. — (Honor of C. Colden, a colonial Lieutenant-Governor of N. Y.) **Coldenia nuttallii**

BB. Plant glabrous, spreading, perennial; leaves obovate to linear, 25-50 mm. long; style entire or none. E. — (Gk. *helos* = the sun, *trope* = a turn; refers to flowering at the summer solstice.) **Heliotropium curassavicum** (HELIOTROPE)

AA. Ovary 4-cleft or -divided; style arising from between the parts of the ovary.

C. Prickles of the nutlets barbed.

D. Nutlets spreading, prickly all over; flowers blue. **CYNOGLOSSUM** (p. 189)

DD. Nutlets erect, prickly on the margin and sometimes on the back; flowers variously colored. — (Diminutive of *L. lappa* = a burr; referring to the fruit.)

Lappula (STICKSEED)

CC. Prickles of the nutlets hooked; flowers white. — (Gk. *pekto* = comblike, *karyon* = a nut; from the comblike margin of the nutlets of some species.)

Pectocarya

CCC. Prickles of the nutlets neither barbed nor hooked, or none at all.

E. Nutlets attached laterally to a pyramid-like projection of the receptacle.

F. Calyx with 5 wide flat lobes and 5 smaller ones alternating with them; corolla blue. E. — (*L. asper* = rough; referring to the leaves.)

Asperugo procumbens (MADWORT)

FF. Calyx simply 5-lobed, without the 5 smaller alternating ones.

G. Lower leaves opposite. — (Gk. *allos* = another, *karyon* = a nut; that is, another kind of nutlet.) **Allocarya**

GG. Leaves all alternate.

H. Flowers yellow.

I. Annual; scar of nutlets ovate or oblong; throat of corolla naked or merely with hairy tufts within. **AMSINCKIA** (p. 190)

II. Biennial or perennial; scar of nutlets very slender; throat of the corolla with prominent folds within. **OREOCARYA** (p. 190)

HH. Flowers white.

J. Stems repeatedly dichotomously branched; annual.

K. Sepals distinct to the base; ventral groove of the nutlets not forked at base; most of the leaves in a basal tuft. E. — (Gk. *eremos* = solitary, *karyon* = a nut. Application not clear.) **Eremocarya micrantha**

KK. Sepals distinct to the middle; ventral groove of the nutlets forked at base; leaves scattered, not mostly basal. E. — (Gk. *piptein* = to fall; + calyx; the upper part of the calyx is deciduous.)

Piptocalyx circumscissus

JJ. Stems not dichotomously branched; annual or perennial.

- L.** Annual; pedicels persistent; leaves mostly in a basal tuft; nutlets keeled on both sides. **PLAGIOBOTHRYS** (p. 189)
- LL.** Biennial or perennial; pedicels persistent; leaves scattered along the stem; nutlets not keeled. **OREOCARYA** (p. 190)
- LLL.** Annual; pedicels deciduous (except in *C. pterocarya*); leaves scattered along the stem; nutlets not keeled (except some in *C. pterocarya*).— (Gk. *kryptos* = hidden, *anthos* = a flower; because the corolla is sometimes very small.) **Cryptanthe** (NIEVITAS)
- HHH.** Flowers blue or purple or pink.
- M.** Nutlets erect; corolla tubular-funnelform; plant not conspicuously white-hairy nor silvery-hairy. **MERTENSIA** (p. 191)
- MM.** Nutlets ascending to horizontal; corolla rotate or salverform; plant conspicuously silvery- or white-hairy. **ERITRICHIUM** (p. 189)
- EE.** Nutlets attached by the very base.
- N.** Raceme bractless; roots slender; flowers white or blue; corolla lobes convolute in the bud. **MYOSOTIS** (p. 190)
- NN.** Raceme bracted; roots thick; flowers white or yellow; corolla lobes imbricate in the bud. **LITHOSPERMUM** (p. 191)

CYNOGLOSSUM (HOUND'S TONGUE)

Coarse, hairy, perennial. Flowers in paniced racemes. Corolla with conspicuous arching crests at the throat. Stamens included. Style included.— (Gk. *kyon* = a dog, *glossa* = the tongue; from a resemblance in the leaf.)

- A.** Lower leaves ovate to subcordate; upper leaves wing-petioled; calyx segments ovate; corolla tube hardly exceeding its lobes. W. C. **C. grande**
- AA.** Lower leaves spatulate; upper leaves sessile or partly clasping; calyx segments lanceolate; corolla tube 2-3 times as long as its lobes. U. C. **C. occidentale**

ERITRICHIUM

Leaves 2 cm. or less long. Flowers blue. Appendages almost closing the corolla-throat. Stamens included. Border of nutlets acute.— (Gk. *erion* = wool; *thrix* = hair; referring to the hairy herbage.)

- A.** Basal leaves linear-spatulate; corolla 8-10 mm. wide; nutlets wingless, the sharp edge entire; plant with short silky hairs. C. **E. howardi**
- AA.** Basal leaves lanceolate to ovate; corolla 4-6 mm. wide; nutlets winged, the wing toothed or lobed; plant with long shaggy hairs. C. E. **E. argenteum**

PLAGIOBOTHRYS (POP-CORN FLOWER)

Flowers in circinate racemes. Corolla-throat conspicuously appendaged. Nutlets 3-angled, incurved.— (Gk. *plagios* = oblique, *bothros* = a trench; probably referring to the scar on the nutlet.)

- A.** Plant pubescent to tomentose, not hispid.
- B.** Stem simple up to the racemes.
- C.** Basal leaves oblanceolate; calyx cleft almost to base. U. **P. campestre**

- CC. Basal leaves linear to spatulate; calyx cleft to the middle or very little below it. U. *P. shastensis*
- BB. Stem branching from the base.
- D. Calyx cleft to below the middle, persistent; nutlets somewhat cross-shaped. W. E. *P. tenellus*
- DD. Calyx cleft only to the middle, soon deciduous by separating near its base; nutlets ovate.
- E. Plant 1-2.5 cm. high, white-hairy; nutlets 3 mm. long. W. C. *P. canescens*
- EE. Plant 2.5-5 cm. high, hairy but not white-hairy; nutlets 2 mm. long. W. C. *P. nothofulvus*
- AA. Plant hispid.
- F. Nutlets with transverse wrinkles; branches hispid but stem not so. (See D.)
- FF. Nutlets without transverse wrinkles; branches and stem both hispid. E. *P. hispidus*

OREOCARYA

Flowers white or yellow, in headlike or paniced racemes. Corolla with 10 scales or glands at base within; throat with prominent folds within. — (Gk. *oros* = a mountain, *karyon* = a nut; probably referring to the habitat.)

- A. Corolla tube exceeding the calyx. E. *O. leucophaea*
- AA. Corolla tube not exceeding the calyx.
- B. Plant thinly stiff-hairy; inflorescence not tawny-hairy; leaves obtuse. E. *O. sericea*
- BB. Plant densely stiff-hairy; inflorescence not tawny-hairy.
- C. Leaves obtuse; inflorescence very dense. E. *O. celosioides*
- CC. Leaves acute, inflorescence not very dense. E. *O. spiculifera*

AMSINCKIA (FIDDLE NECK)

Coarse, hispid. Leaves oblong to linear. Flowers in racemes or spikes. Calyx persistent. Corolla salverform to funnelform; throat naked or with minute hairy tufts opposite the lobes. Nutlets 3-angled. — (Honor of W. Amsinck, a German, who materially aided the Hamburg Botanical Garden.)

- A. Nutlets roughened with short hard points, convex or keeled on the back.
- B. Calyx lobes linear; plant erect. W. E. *A. intermedia*
- BB. Calyx lobes lanceolate or ovate; plant spreading. W. E. *A. lycopsoides*
- AA. Nutlets not roughened with points, the projections rounded and smooth, nearly flat on the back, not keeled. E. *A. tessellata*

MYOSOTIS (FORGET-ME-NOT)

Flowers in racemes or spikes. Corolla salverform to rotate; throat with small blunt crests at the base of the lobes. Stamens included. Nutlets smooth; scar minute. — (Gk. *myos* = of a mouse, *otos* = of an ear; hence mouse-earlike, referring to the short soft leaves.)

- A. Corolla blue; calyx open in fruit; calyx hairs appressed, none of them hooked nor gland-tipped.
- B. Calyx lobes much shorter than the calyx tube. W. *M. scorpioides* (GARDEN FORGET-ME-NOT)
- BB. Calyx lobes as long as calyx tube. W. E. *M. laxa* (BLUE FORGET-ME-NOT)
- AA. Corolla white; calyx closing on fruit; calyx hairs spreading, some of them minutely hooked or gland-tipped. W. E. *M. macrosperma* (WHITE FORGET-ME-NOT)

MERTENSIA (LUNGWORT)

Perennial. Flowers rather large, in panicles or cymes or racemes. Calyx lobes linear to triangular, not much enlarged in fruit. Stamens included. Ovary 4-divided. Nutlets wrinkled when mature. — (Honor of F. K. Mertens, a German botanist.)

A. Plants of the seashore; nutlets fleshy, smooth and shining. W.

AA. Plants not of the seashore; nutlets dry, wrinkled when mature.

M. maritima (SEA LUNGWORT)

B. Plants 5-10 dm. high; leaves thin, wide.

C. Leaves soft-hairy beneath, upper surface various; calyx glabrous or hairy on the back.

D. Upper leaf surface stiff-hairy.

E. Calyx lobes canescent. E.

M. membranacea

EE. Calyx lobes not canescent.

F. Calyx lobes pubescent on the back. W.

M. platyphylla

FF. Calyx lobes glabrous on the back. E. **M. paniculata** (TALL LUNGWORT)

DD. Upper leaf surface smooth or merely papillose.

G. Calyx lobes pubescent on the back. C. E.

M. subcordata

GG. Calyx lobes glabrous on the back. W. E.

M. leptophylla

CC. Leaves glabrous on both sides or merely papillose above; calyx glabrous on the back.

H. Calyx lobes either short and obtuse or triangular and acute, not longer than the fruit.

I. Leaves acute, mostly sessile; calyx lobes obtuse. C.

M. ambigua

II. Leaves acuminate, short-petioled; calyx lobes acute. E.

M. brachycalyx

HH. Calyx lobes elongate, acute, much longer than the fruit.

J. Leaves many, pallid, ovate, acuminate. W. C. E.

M. laevigata

JJ. Leaves few, green, oblong-lanceolate, obtuse or acutish. E.

M. infirma

BB. Plants 1.5-4 dm. high; leaves narrow, thickish.

K. Basal leaves numerous, their dry bases remaining on the crown of the root; root vertical, not tuberous.

L. Leaves pubescent on both sides.

M. Plant 1-1.5 dm. high. E.

M. pubescens

MM. Plant 3-4.5 dm. high. E.

M. cusickii

LL. Leaves glabrous on both sides or merely with some short stiff hairs above. E.

M. nutans

KK. Basal leaves none; root not a taproot, tuberous or fasciculate-tuberous.

N. Leaves glabrous or merely papillose above. E.

M. pulchella

NN. Leaves stiff-hairy above.

O. Corolla tube 1-2 times as long as its limb. E.

M. horneri

OO. Corolla tube 3-4 times as long as its limb. E.

M. oblongifolia

LITHOSPERMUM (GROMWELL)

Perennial. Leaves sessile. Corolla salverform or funnelform; throat pubescent or crested. — (Gk. *lithos* = a stone, *sperma* = a seed.)

A. Sepals 8-16 mm. long; corolla about 20-25 mm. long, bright yellow, lobes much shorter than the throat. U.

L. californicum

AA. Sepals 6-8 mm. long; corolla 12-16 mm. long, dull greenish-yellow, lobes about equaling the throat. W. E.

L. ruderales (WOOLLY GROMWELL)

VERBENACEAE (VERVAIN FAMILY)

Perennial herbs. Leaves opposite. Flowers perfect, in terminal or axillary spikes. Corolla sympetalous, regular or 2-lipped. Stamens didynamous unless only 2, on the corolla, alternate with the corolla lobes. Ovary superior, 2-4-celled; carpels 2; ovules 4; style 1, terminal; stigmas 1-2. Fruit dry, separating into 4 nutlets — Only the following genus.

VERBENA (VERVAIN)

Stems 4-angled. Leaves pinnately veined. Flowers bracted, blue or purple or pink. — (Said to be from Celtic *farfaen* = to remove stone. Application not clear.)

A. Bracts shorter than the calyx.

B. Corolla 8-10 mm. long; plant erect. E.

V. *stricta* (HOARY VERVAIN)

BB. Corolla about 4 mm. long.

C. Plant erect. E.

V. *hastata* (BLUE VERVAIN)

CC. Plant spreading or ascending. U.

V. *prostrata*

AA. Bracts longer than the calyx; plant prostrate or decumbent. E. V. *bracteosa*

MENTHACEAE (MINT FAMILY)

Herbs or shrubs, erect to vinelike, *stems mostly 4-angled. Leaves simple, opposite, mostly punctate; stipules none. Flowers mostly irregular, perfect, variously clustered but mostly in axillary whorls. Calyx persistent, regular to 2-lipped, 4-5-lobed, mostly veined. Corolla limb 4-5-lobed, mostly 2-lipped; upper lip entire to 2-lobed; lower lip usually 3-lobed. Stamens on the corolla tube, alternate with the petal lobes, usually 4; 2 usually shorter or antherless or rudimentary or wanting. Ovary 4-lobed or -parted, superior; ovules 4; style 1, 2-lobed. Fruit of 4 nutlets.*

A. Herbs.

B. Plants erect or merely spreading, not vinelike.

C. Corolla distinctly irregular, distinctly 2-lipped in most.

D. Stem villous or densely tomentose.

E. Leaves acute; flowers in terminal spikes on stem and branches; stamens projecting beyond the corolla tube.

F. Leaves mostly rounded at base; calyx 10-veined; corolla not dark-dotted; ovary 4-lobed. E. — (Honor of Teucer, a King of Troy who first used it medicinally.)

Teucrium *occidentale* (GERMANDER)

FF. Leaves mostly cordate at base; calyx 15-veined; corolla dark-dotted; ovary 4-parted. W. E. — (Said to be from Nepete, a town in Tuscany, Italy.)

Nepeta *cataria* (CATNIP)

EE. Leaves obtuse; flowers in dense axillary clusters; calyx 5-10-veined; corolla not dotted; stamens included in the corolla tube. W. E. — Medicinal plant. (Hebrew *morrob* = a bitter juice.)

Marrubium vulgare (HOREHOUND)

DD. Stem not villous nor tomentose, though often hairy.

G. Calyx with a crest or protuberance on one side. **SCUTELLARIA** (p. 194)

GG. Calyx without crest or protuberance.

H. Calyx 15-veined.

I. Leaves not entire; leaf blades widest at or below their middle.

J. Plants not aromatic; flowers in elongated spikelike clusters; all 4 stamens with anthers.

K. Perennial; leaves triangular-ovate; inflorescence bracts not pectinate; lower lip of corolla with middle lobe crenulate.

AGASTACHE (p. 194)

KK. Annual or biennial; leaves lanceolate; inflorescence bracts pectinate; lower lip of corolla with middle lobe not crenulate. C. E. — (Gk. *drakon* = a dragon, *kephale* = a head; referring to the form of the flower in some species.)

Dracocephalum parviflorum (DRAGONHEAD)

JJ. Plants aromatic; flowers in flattened or round headlike clusters; 2 stamens with anthers, 2 others from antherless to totally absent.

MONARDA (p. 195)

II. Leaves entire, oblanceolate to obovate. U. — (Gk. *pogon* = a beard, *gyne* = the pistil; referring to the bearded style.)

Pogogyne douglasii

HH. Calyx 5-13-veined.

L. Leaves not cleft.

M. Flowers in terminal headlike or dense spikelike clusters; calyx 10-13-veined.

N. Heads elongated, spikelike. W. C. E. — (German *braune* = quinsy, for which this was thought a remedy.)

Prunella vulgaris (HEAL-ALL)

NN. Heads flat.

MADRONELLA (p. 195)

MM. Flowers in loose interrupted terminal spikelike clusters; calyx 5-10-veined.

O. Leaf teeth sharp-pointed, not rounded; leaves narrowed at base. W. C. E. — (Gk. *physa* = a bladder, *stege* = a covering; referring to inflated fruiting calyx.)

Physostegia parviflora (FALSE DRAGONHEAD)

OO. Leaf teeth somewhat rounded at tip; leaves rounded to cordate at base.

STACHYS (p. 195)

MMM. Flowers in whorls in the axils of ordinary stem leaves; calyx about 5- or 13-veined.

P. Annual or biennial; upper leaves sessile; flowers purple or red; calyx about 5-veined. E. — (Gk. *laimos* = the throat; because the corolla is widely gaping.)

Lamium amplexicaule (HENBIT)

PP. Perennial; upper leaves petioled; flowers white or yellow; calyx about 13-veined. E. — (Greek name of the honeybee; the flowers are very sweet.)

Melissa officinalis GARDEN (BALM)

LL. Leaves 3-cleft or some 5-cleft; flowers in the axils of ordinary leaves.

W. — (Gk. *leon* = a lion; *oura* = a tail; suggested by the inflorescence.)

Leonurus cardiaca (MOTHERWORT)

CC. Corolla regular or nearly so.

Q. Annual; leaves entire or merely slightly wavy; ovary deeply 4-lobed.

TRICHOSTEMA (p. 194)

QQ. Perennial; leaves toothed; ovary 4-parted.

R. Plants without mint odor; 2 stamens with anthers and 2 antherless.

LYCOPUS (p. 196)

RR. Plants with mint odor; all 4 stamens with anthers. MENTHA (p. 196)

BB. Plants prostrate, vinelike.

S. Plant with disagreeable odor; petioles 25 mm. or more long; leaves dark green; flowers in small clusters in the leaf axils. W. — (Greek name for some plant of this family.)
Glechoma hederacea (GROUND IVY)

SS. Plant with mint odor; petioles 4-6 mm. long; leaves red-green; flowers solitary in the leaf axils. W. E. — (Gk. mikros = small, meros = a division; referring to the slightly 2-lipped perianth.) Micromeria douglasii (TEA VINE)

AA. Shrubs aromatic; leaves entire, spatulate to obovate. E. — (Possibly French ramon = a broom of twigs; it is a low, much-branched shrub.) Ramona incana

TRICHOSTEMA (BLUE CURLS)

Flowers blue, in axillary panicles or cymes. Calyx 5-lobed. Corolla tube narrow; lobes somewhat similar, oblong. Stamens 4. — (Gk. trichos = hair, stemon = a stamen; the stamens are long and hairlike.)

A. Calyx lobes lanceolate, acuminate; corolla tube not exceeding the calyx. W. E.
T. oblongum

AA. Calyx-lobes ovate-triangular, acute; corolla tube exceeding the calyx.

B. Leaves acuminate, obscurely veined; corolla 6-8 mm. long. U. T. laxum

BB. Leaves acute, strongly veined; corolla about 12 mm. long. W.

T. lanceolatum (VINEGAR WEED)

SCUTELLARIA (SKULLCAP)

Bitter. Flowers blue or violet or whitish, in spikelike racemes, or 1-3 in each leaf axil. Calyx 2-lipped; lips entire, lower persistent. Corolla much exerted, glabrous inside. Stamens 4, all with anthers. — (L. scutella = a dish; referring to the appendages of the calyx in fruit.)

A. Leaves or at least the lower ones somewhat serrate or dentate.

B. Leaf blades widest below their middle.

C. Flowers in axillary and sometimes also terminal racemes; corolla 6-10 mm. long.
W. E. S. lateriflora (MAD-DOG SKULLCAP)

CC. Flowers solitary in the leaf axils; corolla 14-30 mm. long.

D. Leaves obtuse, 6-12 mm. long. U.

S. tuberosa

DD. Leaves acute, 10-37 mm. long. E. S. galericulata (MARSH SKULLCAP)

BB. Leaf blades widest above middle; flowers solitary in leaf axils. E. S. nana

AA. Leaves entire.

E. Stem leaves obtuse at both ends; corolla 14-20 mm. long. W. E.

S. antirrhinoides

EE. Stem leaves acute at base; corolla 16-25 mm. long. U. E.

S. angustifolia

AGASTACHE (GIANT HYSSOP)

Erect, tall. Leaves serrate, petioled. Flowers yellowish or purplish or blue, in whorled clusters in spikes; spikes bracted, terminal. Calyx

slightly 2-lipped, 5-toothed. Upper lip of corolla 2-lobed; lower lip 3-lobed. Stamens 4, lower pair shorter; anthers 4. — (Gk. *agan* = much, *stachys* = a head of wheat; referring to the many spikes.)

A. Leaves canescent and white beneath, glabrous and green above; spikes 25 mm. or less thick. E. **A. urticifolia**

AA. Leaves glabrous and green on both sides; spikes 25 mm. or more thick. E.

A. occidentalis

STACHYS (HEDGE NETTLE)

Flowers purple, whorled in spikes. Calyx 5-toothed. Upper lip of corolla entire or emarginate; lower lip 3-cleft, middle lobe wider and sometimes 2-lobed. Stamens 4, lower 2 longer. — (Gk. *stachys* = a spike or head of wheat; referring to the inflorescence.)

A. Corolla tube less than $1\frac{1}{2}$ times as long as the calyx.

B. Plant soft hairy; corolla white or cream-colored with some purple on the lower lip. W. E. **S. pycnantha**

BB. Plant rather stiff-hairy; corolla light red to purple, often spotted.

C. Upper leaves sessile, lower short-petioled; leaves acute or acuminate. W. E.

S. palustris (WOUNDWORT)

CC. Upper leaves short-petioled, lower long-petioled; leaves obtuse or acute. W. E. **S. bullata**

AA. Corolla tube twice as long as the calyx.

D. Leaves tomentose beneath, thick; corolla about 20 mm. long. W. C. **S. chamissonis**

DD. Leaves not tomentose beneath, thin.

E. Corolla about 20 mm. long; calyx glabrous or sparingly stiff-hairy. W. C. E. **S. ciliata**

EE. Corolla about 12 mm. long; calyx soft-hairy. W. **S. pubens**

MONARDA (BERGAMOT MINT)

Flowers variously colored. Calyx 5-toothed. Corolla glabrous inside; upper lip emarginate or entire; lower lip 3-lobed, middle lobe larger. Anther-bearing stamens 2, usually exserted; antherless stamens or their rudiments 2 or none. — (Honor of N. Monardes, a Spanish botanist.)

A. Leaves oblong to ovate; stamens longer than the upper lip of the corolla; corolla not spotted, its upper lip straight; heads solitary, terminal. E. **M. mollis**

AA. Leaves lanceolate or narrower; stamens shorter than the upper lip of the corolla; corolla purple-spotted, its upper lip curved; heads many, terminal and axillary. W. **M. punctata** (HORSE MINT)

MADRONELLA

Leaves mostly entire. Flowers purple or red or white, bracted. Calyx 5-toothed. Corolla tube as long as the calyx; throat glabrous inside; upper lip 2-cleft; lower lip 3-cleft, the lobes nearly equal. Stamens 4, equal, or the lower 2 longer, exserted. — (An anagram of *Monardella*, the diminutive of *Monarda*.)

A. Leaves white-tomentose or tomentulose beneath.

B. Leaves paler beneath than above, veins not prominent. C. E. **M. discolor**

- BB. Leaves not paler beneath, veins prominent. E. *M. nervosa*
 AA. Leaves not so beneath.
 C. Plant somewhat canescent. U. *M. villosa*
 CC. Plant glabrous or puberulent except the inflorescence.
 D. Leaves not as long as the stem internodes. U. E. *M. reflexa*
 DD. Leaves mostly longer than the stem internodes.
 E. Plant very smooth and shining except the inflorescence; leaves obtuse. E. *M. purpurea*
 EE. Plant somewhat ashy-gray with scurfy puberulence; leaves acute. E. *M. odoratissima*

LYCOPUS (WATER HOREHOUND)

Flowers small, white or purple, bracted, whorled in dense axillary clusters. Calyx 4-5-toothed. Corolla equaling or exceeding the calyx; limb either nearly equally 4-cleft or else one of the lobes wider and emarginate. — (Gk. *lykos* = a wolf, *pous* = a foot; from a fancied resemblance in the leaves.)

- A. All of the leaves or all but the upper ones irregularly incised or lacinate-pinnatifid. W. E. *L. americanus*
 AA. Leaves merely serrate.
 B. Calyx teeth lanceolate or deltoid, obtuse or barely acutish, shorter than the mature nutlets. W. C. E. *L. uniflorus* (BUGLEWEED)
 BB. Calyx teeth narrow, very acute, longer than the mature nutlets.
 C. Leaves short-petioled; bracts about half the length of the calyx; corolla almost twice as long as the calyx. W. *L. rubellus*
 CC. Leaves sessile or very short-petioled; bracts almost as long as the calyx; corolla very little longer than the calyx. E. *L. lucidus*

MENTHA (MINT)

Erect or diffuse. Flowers purple or pink or white; whorls axillary or in terminal spikes. Calyx 10-veined, 5-toothed. Corolla tube shorter than the calyx; limb 4-cleft, slightly irregular; upper lobe usually wider, entire or emarginate. Stamens 4, equal. — (Minthe was a nymph whom the Greeks believed was changed into a Mint.)

- A. Stems finely retrorse-pubescent at least on the angles; flowers in the axils of ordinary leaves. W. C. E. *M. canadensis* (FIELD MINT)
 AA. Stems glabrous or nearly so, hairs when present not retrorse; most of the flowers in the axils of bracts.
 B. Leaves sessile or nearly so; flowers sessile. W. E. *M. spicata* (SPEARMINT)
 BB. Leaves petioled; flowers pedicelled.
 C. Calyx teeth hairy; leaves ovate-oblong to lance-oblong, acute; garden escape. W. *M. piperita* (PEPPERMINT)
 CC. Calyx teeth glabrous; leaves ovate, obtuse or the upper acute. W. E. *M. citrata* (BERGAMOT MINT)

SOLANACEAE (POTATO FAMILY)

Herbs or shrubs, sometimes vines. *Leaves alternate*, pinnately veined; *stipules none*. *Flowers perfect, regular*. Calyx mostly 5-toothed or -lobed. Corolla rotate to tubular, mostly 5-lobed.

Stamens as many as corolla lobes, alternate with them, *on the corolla tube, all equal in length and perfect. Ovary terete, superior, 2-8-celled; style 1. Fruit a berry or a capsule. Seeds many.*

- A. Corolla rotate or campanulate; fruit a berry.
- B. Leaves pinnate, leaflets 5 or more.
 - C. Flowers yellow; fruit yellow or red. W. E. — Cultivated. (Gk. *lykos* = a wolf, *persikos* = the peach.) **Lycopersicum esculentum** (TOMATO)
 - CC. Flowers white to blue; fruit green. **SOLANUM** (p. 197)
- BB. Leaves entire to 3-foliolate.
 - D. Flowers solitary in the leaf-axils; calyx in fruit enlarged, bladdery; corolla campanulate; anthers distinct. **PHYSALIS** (p. 197)
 - DD. Flowers in clusters; calyx in fruit not conspicuously enlarged, not bladdery; corolla rotate; anthers closely fitted together into a cone. **SOLANUM** (p. 197)
- AA. Corolla tubular or salverform or funnelform; fruit a capsule.
- E. Leaves dentate; flowers solitary in the forks of the stems; capsule prickly. **DATURA** (p. 198)
- EE. Leaves entire; flowers in clusters; capsule not prickly. **NICOTIANA** (p. 198)

PHYSALIS (GROUND CHERRY)

Herbs. Leaves entire or sinuately toothed. Calyx campanulate, 5-10-angled or -ribbed, wholly inclosing the fruit. Corolla whitish or yellowish, with dark center, plicate. Stamens near base of corolla. Seeds kidney-shaped. — (Gk. *physalis* = a bladder, from the inflated calyx.)

- A. Annual; leaves ovate to cordate, or rarely some lanceolate, some of them always somewhat sinuate-toothed.
- B. Plant glabrous or merely puberulent; calyx in fruit obscurely 5-10-angled. E. **P. ixocarpa** (TOMATILLO)
- BB. Plant pubescent; calyx in fruit sharply 5-angled. E. **P. pubescens**
- AA. Perennial; leaves lanceolate to oblanceolate, entire or sinuate but not sinuate-toothed. E. **P. lanceolata**

SOLANUM (NIGHTSHADE)

Herbs or shrubs. Leaves alternate, entire to pinnate. Corolla limb plicate. Stamens on throat of corolla. — (Said to be from *L. solamen* = quieting; the Bittersweet is mildly narcotic.)

- A. Plant not prickly; corolla 8-20 mm. wide; calyx in fruit not spiny, not nearly covering the berry.
- B. Climbing; perennial. W. E. — Medicinal. **S. dulcamara** (BITTERSWEET)
- BB. Not climbing nor twining.
 - C. Leaves pinnate; tubers present. W. E. — Cultivated for the tubers. W. E. **S. tuberosum** (POTATO)
 - CC. Leaves entire to 3-foliolate; tubers none.
 - D. Annual; hairs simple; corolla 8-10 mm. wide; leaves not all entire, often rounded or cordate at base; berry green or black or yellow.
 - E. Leaves oblong, pinnately 7-9-lobed; berries green. E. — Poisonous. **S. triflorum** (WILD TOMATO)

- EE.** Leaves ovate, merely wavy-toothed; berries black or yellow. W. C. E. —
The berry of the wild plants is poisonous. The Wonderberry is an edible cultivated form. **S. nigrum** (COMMON NIGHTSHADE)
- DD.** Perennial; hairs stellate; corolla 16–20 mm. wide; leaves all entire, acute or narrowed at base; berry purple. U. **S. umbelliferum**
- AA.** Plant prickly; corolla 25–50 mm. wide; calyx in fruit spiny.
- F.** Corolla white or light blue; fruit only partly covered by the calyx.
- G.** Fruit less than 1 cm. long, almost covered by calyx. W. **S. sisymbriifolium**
- GG.** Fruit 2 dm. or less long, very much exceeding the calyx. E. — Cultivated for its edible fruit. **S. melongena** (EGG PLANT)
- FF.** Corolla yellow; fruit quite covered by the calyx. E. — A bad weed in cultivated fields. **S. rostratum** (BUFFALO BUR)

DATURA (THORN APPLE)

Herbs, annual, erect. Flowers large, white or purple or violet. Calyx tubular or prismatic, circumscissile near the persistent base. Corolla plicate; lobes acuminate. Ovary 2–4-celled. Capsule globose or ovoid. — (From *Dhatura*, the Hindoo name.) Medicinal. Poisonous.

- A.** Stem green; corolla white; lower prickles of the fruit shorter than the others. E. **D. stramonium** (STRAMONIUM)
- AA.** Stem purple; corolla purple or violet; prickles of the fruit all of the same length. E. **D. tatula** (PURPLE THORN APPLE)

NICOTIANA (TOBACCO)

Herbs. Leaves large. Flowers white or green or purple, in terminal racemes or panicles. Calyx 5–8-cleft. Corolla plicate, limb 5–8-lobed. Ovary 2–8-celled. Seeds very small. — (Honor of J. Nicot, a French Ambassador, who early sent tobacco seed to Italy.)

- A.** Leaves all with slender petioles; corolla limb 8–12 mm. wide; calyx teeth much shorter than its tube. E. **N. attenuata**
- AA.** Leaves of some of the upper ones sessile; corolla limb 20–40 mm. wide; calyx teeth about equaling its tube.
- B.** Leaves 2–6 dm. long. W. — Cultivated for its leaf. **N. tabacum** (TOBACCO)
- BB.** Leaves shorter.
- C.** Corolla 25–50 mm. long; capsule 2-celled. U. **N. bigelovii**
- CC.** Corolla 20–25 mm. long; capsule 3–8-celled. U. E. **N. quadrivalvis**

SCROPHULARIACEAE (FIGWORT FAMILY)

Herbs or shrubs. Leaves alternate or opposite or whorled; *stipules none*. Flowers perfect, mostly irregular. Calyx persistent, 1–5-toothed to -divided, sometimes split. *Corolla sympetalous*, rarely none in *Synthyris*; *limb 2-lipped or nearly regular*, variously colored. Anther-bearing stamens 2–5, 2 often shorter, on the corolla, alternate with the corolla lobes; antherless stamens often present. *Pistil 1, entire or 2-lobed*; ovary superior, 1–2-celled; *placenta central*; style 1. Fruit a capsule. Seeds few or many.

A. Herbs.

B. Leaves alternate.

- C. Vines; leaves reniform-orbicular, palmately veined, coarsely dentate or lobed.
W. — Planted along walls. (Gk. *kymbalon* = a cymbal; referring to the leaf form.) **Cymbalaria cymbalaria** (KENILWORTH IVY)

CC. Leaves not as above in all points.

- D. Mud plants, creeping or floating; leaves glabrous, nearly all basal, entire, linear to oblong. W. E. — (L. *limus* = mud, *sella* = a seat; because it is a stemless mud plant.) **Limosella aquatica** (MUDWORT)

DD. Not as above in all points.

- E. Corolla spurred or saccate at base on the lower side.

- F. Leaves sessile; corolla spurred at base. **LINARIA** (p. 201)

- FF. Leaves short-petioled; corolla merely saccate at base.

ANTIRRHINUM (p. 201)

- EE. Corolla neither spurred nor saccate at base on the lower side, but sometimes saccate at base on the upper side.

G. Calyx 5-toothed or -lobed.

- H. Corolla rotate; anther-bearing stamens 5. **VERBASCUM** (p. 201)

- HH. Corolla tubular; anther-bearing stamens 4, rarely 5 in *Pentstemon*.

- I. Leaves entire to dentate; corolla not produced into a long projection.

- J. Leaf blade 0.6–10 cm. long; 5th stamen represented by a filament on the corolla. **PENTSTEMON** (p. 202)

- JJ. Leaf blade 8–25 cm. long; 5th stamen not represented at all. W. — Medicinal plant. (L. *digitalis* = belonging to the finger; the corolla suggests a glove finger.) **Digitalis purpurea** (FOXGLOVE)

- II. Leaves either pinnately-lobed or -parted, or else corolla produced into a long and elephant-trunk-like projection. **PEDICULARIS** (p. 208)

GG. Calyx 1–4-toothed or -lobed.

- K. Corolla nearly regular, rotate or short-campanulate, never yellow.

- L. Leaves chiefly scattered along the stem, at least the lower opposite, entire to toothed; spikes or racemes terminal or axillary; annual or perennial. **VERONICA** (p. 204)

- LL. Leaves chiefly basal, all alternate, toothed to divided; spikes or racemes terminal; perennial. **SYNTHYRIS** (p. 205)

- KK. Corolla distinctly 2-lipped, tubular, often yellow.

- M. Leaves entire to pinnately or palmately parted into 3–11 long lobes, sometimes the lobes again lobed; upper lip of corolla not elephant-trunk-like.

- N. Capsule few-seeded; calyx cleft down 1 side and apparently of 2 sepals; lips of the corolla nearly equal. **ADENOSTEGIA** (p. 208)

- NN. Capsule many-seeded; calyx cleft down 1 or 2 or 4 sides and apparently of 4 sepals or rarely of 2 sepals.

- O. Lips of the corolla nearly equal in length; calyx 2- or 4-toothed.

ORTHOCARPUS (p. 207)

- OO. Lips of the corolla unequal in length; calyx 4-toothed.

CASTILLEJA (p. 205)

- MM. Leaves either serrate and the upper lip of the corolla prolonged into an elephant-trunk-like projection, or else leaves pinnately more than 15-lobed or -parted into rather short wide lobes. **PEDICULARIS** (p. 208)

BB. Leaves opposite or whorled.

P. Calyx 5-toothed or -lobed.

Q. Corolla gibbous or spurred at base on lower side; seeds many. (See **E.**)

QQ. Corolla gibbous at base on upper side; seeds few.

R. Corolla deeply 2-lipped, 6–16 mm. long, blue or pink or variegated; leaves entire to lobed. **COLLINSIA** (p. 202)

RR. Corolla obscurely 2-lipped, 2–10 mm. long, blue or white; leaves lobed to 3–5-divided. **TONELLA** (p. 202)

QQQ. Corolla neither gibbous nor spurred at base on any side; seeds many.

S. Leaves nearly all basal, entire, linear; stem leaves only 2–4. **E.** — (Gk. *chion* = snow, *phileo* = I love; from its habitat.) **Chionophila tweedyi**

SS. Not as above in all points.

T. Calyx deeply cleft at the front or the rear or both.

PEDICULARIS (p. 208)

TT. Calyx about equally notched into 5 teeth or lobes.

U. Flowers solitary in the leaf axils, either with 4 anther-bearing stamens and no rudiment of a 5th stamen, or else with 2 anther-bearing stamens and 2 rudimentary ones.

V. Calyx 5-angled to terete, clefts between its teeth not reaching the middle; anther-bearing stamens 4, antherless stamens 0; leaves often several-veined from the base. **MIMULUS** (p. 203)

VV. Calyx terete, clefts between its teeth extending to the middle or beyond; anther-bearing stamens 2; antherless stamens 2.

W. Leaves pinnately veined, 2.5–5 cm. long; corolla white or yellow, 8–12 mm. long; antherless stamens not forked. **GRATIOLA** (p. 204)

WW. Leaves several-veined from the base, 1.2–2.5 cm. long; corolla red or purple, about 6 mm. long; antherless stamens forked. **W. C. E.** — (Gk. *ilys* = mud, *anthos* = a flower; from the habitat.)

Ilysanthes dubia (FALSE PIMPERNEL)

UU. Flowers in terminal or axillary clusters, with 4 anther-bearing stamens and the rudiments of a 5th stamen.

X. Corolla greenish- or purplish-brown, 8–10 mm. long; 5th stamen represented by a scale on the corolla; herbs. **W. C. E.** — (So named because reputed a cure for scrofula.) **Scrophularia californica** (FIGWORT)

XX. Corolla often some other color, usually longer; 5th stamen a tongue-like filament on the corolla.

Y. Corolla never white nor yellow; antherless stamen shorter than the others; seed winged. **W. C. E.** — (Gk. *chelone* = a turtle; the corolla has the shape of a turtle head.) **Chelone nemorosa** (TURTLEHEAD)

YY. Corolla sometimes white or yellow; antherless stamen about equaling the others; seed wingless. **PENTSTEMON** (p. 202)

PP. Calyx 1–4-toothed or -lobed.

Z. Corolla regular or nearly so, rotate to salverform, never yellow; stamens 2. **VERONICA** (p. 204)

ZZ. Corolla plainly 2-lipped, tubular, often yellow; stamens 4.

a. Leaves entire or with a few bristle-pointed teeth at base; corolla 8–12 mm. long; seeds 2–4. **E.** — (Gk. *melas* = black, *pyros* = wheat; referring to the seed of some species.) **Melampyrum lineare** (COWWHEAT)

aa. Leaves not entire, serrate or crenately dentate to pinnately divided; corolla 12-40 mm. long; seeds several or many.

b. Stem without black lines near the top; leaves pinnately veined, either some of them pinnately lobed or else the upper lip of the corolla long and elephant-trunk-like; corolla white or red or purple or yellow.

PEDICULARIS (p. 208)

bb. Stem with fine black lines near the top; leaves merely crenate-dentate; upper lip of the corolla not elephant-trunk-like; corolla yellow. W. C. E. — (Gk. *rhin* = a snout, *anthos* = a flower; referring to the compressed corolla wings.)

Rhinanthus crussgalli (YELLOW RATTLE)

AA. Shrubs.

c. Plant with young parts glutinous, 6-18 dm. high; leaves 2.5-10 cm. long, pubescent beneath with branched hairs. U. — (Gk. *dis* = 2, *plakos* = a placenta; the splitting of the capsule shows 2 conspicuous placentae.)

Diplacus glutinosus

cc. Plant not glutinous, 1-6 dm. high; leaves 0.6-5 cm. long, not pubescent beneath with branched hairs.

PENTSTEMON (p. 202)

VERBASCUM (MULLEIN)

Flowers rather large. Stamens unequal. Seeds rugose, not winged. — (*L. barbascum* = bearded; on account of its hairiness.)

A. Plant densely woolly; stem leaves strongly decurrent; flowers in a dense terminal spike; filaments of 3 upper stamens hairy, those of 2 lower ones glabrous. W. E. — Medicinal plant.

V. thapsus (COMMON MULLEIN)

AA. Plant nearly glabrous; leaves not decurrent; flowers in a loose terminal raceme; filaments of all 5 stamens hairy. E.

V. blattaria (MOTH MULLEIN)

LINARIA (TOADFLAX)

Leaves alternate or opposite or whorled, linear or linear-oblong. Flowers in racemes or spikes, yellow or blue. Upper lip of corolla 2-lobed; lower 3-lobed. Fifth stamen represented by a gland on the inside of the corolla. — (*L. linum* = flax, which some species resemble.)

A. Perennial, pale green; flower yellow, 25-32 mm. long; seed winged. W. E.

L. vulgaris (BUTTER AND EGGS)

AA. Annual or biennial, green, not pale; flower blue, 6-8 mm. long; seed wingless. W. E.

L. canadensis

ANTIRRHINUM (SNAPDRAGON)

Leaves alternate or opposite. Upper lip of corolla 2-lobed; lower 3-lobed; throat nearly closed. Stamens 4, 2 shorter, the 5th represented by a gland inside the corolla tube. Seed oblong, not winged. — Cultivated or escaped or accidentally introduced. — (Gk. *anti* = like, *rhin* = a snout; referring to the form of the corolla.)

A. Annual; corolla 6-16 mm. long.

B. Calyx segments 10-14 mm. long, linear; corolla purple, 10-15 mm. long. W.

A. orontium

BB. Calyx segments 2-4 mm. long, subulate; corolla dull purple, 8-16 mm. long.

U. C.

A. leptopetalum

- BBB. Calyx segments 4-8 mm. long, oblong; corolla dull white, 6-8 mm. long. E. *A. kingii*
- AA. Perennial; corolla 20-30 mm. long; escaped from gardens. W. *A. majus* (GARDEN SNAPDRAGON)

COLLINSIA (BLUE LIPS)

Herbs, low. Leaves opposite or whorled. Calyx 5-cleft. Upper lip of corolla 2-cleft; lower larger, 3-lobed, its middle lobe a keel-like sac inclosing the stamens and style. Fifth stamen a gland. — (Honor of Z. Collins, an American botanist.)

- A. Inflorescence glandular.
- B. Plant 5-10 cm. high; lower leaves orbicular to oblong; pedicels bent back in fruit; flowers many; calyx lobes broadly subulate, acute; seed oblong, nearly terete, not winged. U. C. *C. torreyi*
- BB. Plant 15-45 cm. high; lower leaves spatulate; pedicels erect in fruit; flowers 1-6 in a whorl; calyx lobes lanceolate to triangular, somewhat obtuse; seed saucer-shaped, winged. C. E. *C. rattani*
- AA. Inflorescence not glandular.
- C. Calyx lobes 2 or more times as long as the calyx tube; pedicels erect in fruit.
- D. Scurfy puberulent; flowers in dense whorls in upper axils. W. *C. multiflora*
- DD. Glabrous throughout; flowers usually solitary in the upper axils. W. C. *C. sparsiflora*
- CC. Calyx lobes scarcely longer than the calyx tube.
- E. Leaves all linear, all entire, or a few of the lower obscurely dentate; pedicels erect in fruit. U. *C. linearis*
- EE. Leaves not all linear, at least the lower wider, nearly always at least the lower ones distinctly toothed or notched.
- F. Corolla 8-18 mm. long, its tube shorter than the limb.
- G. Corolla 8-10 mm. long; pedicels erect in fruit. W. C. *C. pusilla*
- GG. Corolla 12-18 mm; pedicels bent back in fruit. W. C. *C. grandiflora*
- FF. Corolla 5-7 mm. long, its tube longer than the limb; pedicels bent back in fruit. W. C. E. *C. parviflora*

TONELLA

Herbs, annual, small. Leaves opposite. Flowers small, in axillary whorls. Calyx 5-lobed. Corolla slightly gibbous at base, 5-lobed. Stamens 4, the 5th a rudiment. Capsule subglobose, septicidal. Seeds 2-4. — (Meaning not determined.)

- A. Stem weak and filiform; corolla 2-3 mm. wide; ovules and seeds 1 in each cell. C. E. *T. collinsioides*
- AA. Stem stout; corolla 6-10 mm. wide; ovules and seeds 3-4 in each cell. E. *T. floribunda*

PENTSTEMON (BEARDTONGUE)

Perennial. Leaves opposite, sometimes partly alternate or whorled. Calyx 5-lobed. Limb of corolla 2-lipped; upper lip 2-lobed; lower 3-lobed. Stamens 4, included, 2 shorter; 5th stamen a mere filament. — (Gk. *pente* = 5, *stemon* = a stamen; because the 5th stamen is conspicuous, although antherless.) Large and difficult genus. (F. & R. pp. 346-349.)

MIMULUS (MONKEY FLOWER)

Flowers either solitary in the leaf axils or in terminal racemes. Calyx tubular, persistent, upper tooth usually largest. Corolla irregular to nearly regular; tube cylindric; limb 2-lipped; upper lip 2-lobed; lower 3-lobed. Stamens 4, 2 shorter. Stigma 2-lobed. Capsule obtuse, not exceeding the calyx. — (Gk. *mimo* = an ape; from the grinning corolla.)

A. Flowers yellow.

B. Leaves with 3 or more veins from the base.

C. Stems leafy, not scapose, rarely only 1-flowered.

D. Corolla 25–50 mm. long; calyx shorter than the corolla, its lobes equal or unequal.

E. Plant not viscid-hairy.

F. Plants 15–60 cm. high, without rhizomes; stems more than 1-flowered.

G. Leaves oblong to orbicular; plant glabrous throughout or pubescent to puberulent in the inflorescence; capsule oblong; seeds oblong. W. C. E.

M. langsdorffii

GG. Leaves oblong-lanceolate; plant glabrous throughout; capsule obovate; seed obovate. W.

M. scouleri

FF. Plants 2–4 cm. high, with rhizomes; stems mostly 1-flowered. C.

M. alpinus

EE. Plant viscid-hairy, 10–20 cm. high, with rhizomes. W. E.

M. implexus

DD. Corolla 8–16 mm. long; calyx shorter than the corolla, its lobes unequal.

H. Stems stout, 4-angled, branching from the base. W. C. E.

M. nasutus

HH. Stems slender, terete, mostly simple. E.

M. microphyllus

DDD. Corolla 4–6 mm. long; calyx longer than the corolla, its lobes nearly equal.

E.

M. breviflorus

CC. Stem leafless, scapose, 1-flowered. C. E.

M. primuloides

BB. Leaves with only 1 vein from the base.

I. Calyx 5-angled, 5-toothed.

J. Corolla 20–25 mm. long.

K. Plant not viscid; hairy lines inside the corolla extending to its base; seed ovate. W.

M. dentatus

KK. Plant viscid; hairy lines inside the corolla not extending to its base; seed spherical. W. C. E.

M. moschatus (MUSK FLOWER)

JJ. Corolla 4–20 mm. long.

L. Plant villous with spreading white hairs, prostrate or spreading. E.

M. floribundus

LL. Plants glabrous or puberulent, not villous, erect (except *M. alsinoides*).

M. Calyx teeth distinctly unequal, 2 larger; lower lip of corolla with bright crimson spot in center. W. C. E.

M. alsinoides

MM. Calyx teeth equal or very nearly so; corolla without crimson spot.

N. Leaves with wide petioles; corolla 10–20 mm. long.

O. Calyx cylindric in fruit; capsule oblanceolate. E.

M. peduncularis

OO. Calyx distended in fruit; capsule oblong. E.

M. pulsifera

NN. Leaves sessile but narrowed at base; corolla 6–8 mm. long. C. E.

M. rubellus

II. Calyx not angled, 5-cleft; corolla 6–8 mm. long, under lip usually with a pair of brown spots. E.

M. pilosus

AA. Flowers pink or red or purple.

P. Corolla 5–10 mm. long; stigma 2-lipped.

- Q. Plant not viscid or merely viscid-puberulent; corolla 6-8 mm. long; some of the leaves wider than linear. C. E. *M. rubellus*
- QQ. Plant viscid-pubescent with spreading hairs; corolla 8-10 mm. long; leaves linear. C. E. *M. breweri*
- PP. Corolla 14-20 mm. long; stigma funnelform.
- R. Leaves elliptic or merely the upper ones ovate, acute.
- S. Calyx teeth subulate, about $\frac{1}{2}$ as long as the calyx tube. E. *M. bigelovii*
- SS. Calyx teeth triangular, acute, $\frac{1}{4}$ - $\frac{1}{2}$ as long as the calyx tube. E. *M. nanus*
- RR. Leaves ovate, acuminate; calyx teeth triangular-subulate. E. *M. cusickii*
- PPP. Corolla 22-50 mm. long; stigma either 2-lipped or funnelform.
- T. Perennial; calyx 16-30 mm. long; style glabrous.
- U. Upper leaves often connate; calyx 25-30 mm. long; corolla scarlet and yellow; stamens exserted. W. E. *M. cardinalis*
- UU. Leaves not connate; calyx 16-20 mm. long; corolla rose-red and purplish; stamens included. C. E. *M. lewisii*
- TT. Annual; calyx 10-12 mm. long; style pubescent above; upper leaves often connate. U. E. *M. subuniflorus*

GRATIOLA (HEDGE HYSSOP)

Annual. Leaves entire or dentate. Flowers solitary in the leaf axils. Corolla 2-lipped; upper lip entire to 2-cleft; lower 3-lobed. — (*L. gratia* = a favor, from supposed medicinal value.)

- A. Peduncles 2-bracted under the calyx; sepals shorter than the corolla; capsule about equaling the calyx. W. C. E. *G. virginiana*
- AA. Peduncles bractless; sepals equaling the corolla; capsule much shorter than the calyx. W. C. *G. ebracteata*

VERONICA (SPEEDWELL)

Flowers white or pink or blue. Corolla rotate; limb 4-5-lobed. Stamens 2. Ovary 2-celled. Capsules somewhat flat, loculicidal. — (Said to be in honor of St. Veronica.)

- A. Flowers in the axillary racemes; bracts of the racemes small, not leaflike; perennial.
- B. Leaves linear to linear-lanceolate; capsule distinctly flat; seeds several. W. C. E. *V. scutellata* (MARSH SPEEDWELL)
- BB. Leaves ovate to oblong-lanceolate; capsule turgid, orbicular or nearly so; seeds many.
- C. Stem leaves short-petioled, serrate. W. C. E. *V. americana* (BROOKLIME)
- CC. Stem leaves sessile or somewhat clasping, serrate or entire. E. *V. anagallis-aquatica* (WATER SPEEDWELL)
- AA. Flowers solitary in the axils of the upper leaves which are either foliaceous leaves or leaflike bracts.
- D. Perennial; most of the leaves opposite; inflorescence leaves much reduced, the upper bractlike.
- E. Lower leaves petioled, upper sessile; capsule wider than long.
- F. Rachis and pedicels puberulent but not glandular-hairy; corolla whitish or pale blue. W. E. *V. serpyllifolia* (THYME-LEAVED SPEEDWELL)
- FF. Rachis and pedicels glandular-hairy; corolla dark blue. W. C. E. *V. humifusa*
- EE. All the leaves sessile; capsule longer than wide.
- G. Leaves longer than the internodes; corolla 6-10 mm. wide.

- H. Stem glabrous; sepals lanceolate; corolla blue to violet. W. C. E. *V. cusickii*
- HH. Stem pubescent above, glabrous below; sepals oblong to ovate; corolla white with purplish throat. C. *V. allenii*
- GG. Leaves shorter than the internodes; corolla 5-6 mm. wide. (See B.)
- DD. Annual; most of the leaves alternate; inflorescence leaves normal or merely smaller.
- I. Flowers in the axils of reduced leaves; pedicels short; seed flat.
- J. Plant glabrous or merely glandular-puberulent; lowest leaves oval-oblong, toothed; petals white. W. E. *V. peregrina* (NECKWEED)
- JJ. Plant pubescent; lowest leaves ovate, crenate; petals blue. W. C. E. *V. arvensis* (WALL SPEEDWELL)
- II. Flowers in the axils of ordinary leaves; pedicels long; seed cup-shaped; petals blue; plant pubescent. E. *V. tournefortii*

SYNTHYRIS

Stem simple. Flowers white or pink or blue or purple. Calyx 4-parted. Corolla 4-cleft, rarely none. Stamens 2, rarely 4. — (Gk. *syn* = together, *thyris* = a little door; referring to the closed valves of the pod.)

- A. Leaves reniform-orbicular; flowers in racemes.
- B. Petals entire.
- C. Scape naked except for the floral bracts, usually shorter than the leaves; calyx lobes ovate. W. C. *S. rotundifolia*
- CC. Scape with some scattered and alternate or opposite leaves, exceeding the leaves; calyx lobes lanceolate. E. *S. reniformis*
- BB. Petals laciniately incised. W. *S. schizantha*
- AA. Leaves not reniform-orbicular; flowers in spikes.
- D. Leaves crenulate; corolla none. E. *S. rubra*
- DD. Leaves pinnatifid; corolla whitish, nearly twice as long as the calyx. W. E. *S. pinnatifida*

CASTILLEJA (INDIAN PAINTBRUSH)

Parasitic on the roots of other plants. Leaves entire to pinnatifid. Flowers in spikes; spikes terminal, leafy-bracted; bracts often brightly colored. Calyx tubular, laterally flattened, the 2 lobes 2-toothed. Corolla very irregular; tube not exceeding the calyx; limb 2-lipped; upper lip long, laterally flattened, entire; lower lip short, 3-toothed. Stamens 4, 2 shorter; anther sacs unequal, the outer attached by its middle, the inner hanging by its end. Capsule ovoid or oblong. Seeds reticulate. — (Honor of D. Castillejo, a Spanish botanist.)

- A. Upper bracts of the inflorescence red or purple.
- B. Bracts of the inflorescence entire.
- C. Plant villous-pubescent throughout.
- D. Annual; bracts linear; corolla 12-20 mm. long. E. *C. exilis*
- DD. Perennial; bracts oblong to broadly cuneate; corolla 25-30 mm. long. E. *C. elmeri*
- CC. Plant glabrous except the inflorescence; bracts scarlet. W. C. E. *C. miniata*
- BB. Bracts of the inflorescence somewhat lobed or dissected.
- Calyx more deeply cleft in front than behind; leaves often all entire.

- F. Calyx 16-20 mm. long; plant 2-3 dm. high, pubescent to base; corolla 2.5-3 cm. long. E. *C. elmeri*
- FF. Calyx 20-30 mm. long; plant 5-10 dm. high, glabrous below; corolla 4-5 cm. long. E. *C. linearifolia*
- EE. Calyx more deeply cleft behind than in front. E. *C. covilleana*
- EEE. Calyx cleft to about the same depth behind as in front.
- G. Corolla tube about 3 times as long as its upper lip. E. *C. rubida*
- GG. Corolla tube 1-2 times as long as its upper lip.
- H. Stems glabrous below; bracts crimson or white. W. C. E. *C. oreopola*
- HH. Stems not glabrous below; bracts scarlet.
- I. Plants ashy-pubescent. E. *C. pruinosa*
- II. Plant not ashy-pubescent.
- J. Plant densely glandular; leaves lanceolate to obovate. E. *C. applegatei*
- JJ. Plant not glandular or only sparingly so.
- K. Leaves all entire.
- L. Stems 3-4 dm. high; leaves oblong-linear, 5-10 cm. E. *C. pinetorum*
- LL. Stem 2-3 dm. high; leaves lanceolate.
- M. Leaves 2-4 cm. long; bracts entire or merely few-toothed near the apex. C. *C. crispula*
- MM. Leaves 5-15 cm. long; bracts cleft into linear lobes. (See NN.)
- KK. Leaves or some of them deeply lobed.
- N. Middle lobe of bracts wide and rounded; halves of the calyx each with 2 very shallow lobes or merely emarginate or entire. E. *C. camporum*
- NN. All segments of the bracts linear; halves of the calyx each with 2 lanceolate or ovate-lanceolate lobes. W. C. E. *C. angustifolia*
- GGG. Corolla tube much shorter than its upper lip.
- O. Stem 1-2 dm. high, from stout caudices; bracts with linear lobes. C. *C. rupicola*
- OO. Stem 3-6 dm. high, from slender rhizomes; bracts with short lobes. C. *C. suksdorfii*
- AA. Upper bracts of the inflorescence green or white or yellowish.
- P. Bracts of the inflorescence lobed or cleft.
- Q. Calyx 10-20 mm. long.
- R. Plant ashy-pubescent or -puberulent; corolla 10-20 mm. long.
- S. Inflorescence more or less pilose. E. *C. fasciculata*
- SS. Inflorescence not pilose.
- T. Upper leaves lobed; inflorescence not glandular; upper lip of the corolla twice as long as the lower. E. *C. pallescens*
- TT. All the leaves often entire; inflorescence somewhat glandular; upper lip of the corolla 4 times as long as the lower. E. *C. rustica*
- RR. Plant glabrous or pubescent or pilose, but not ashy.
- U. Calyx 2-cleft, the lobes 2-toothed or -cleft.
- V. Upper lip of the corolla more than twice as long as its tube.
- W. Pubescence soft, pilose. W. *C. laevisecta*
- WW. Pubescence harsh, stiff. E. *C. lutescens*
- VV. Upper lip of the corolla less than twice as long as its tube. (See KK.)
- UU. Calyx cleft into 4 almost equal lobes; corolla 12-15 mm. long. E. *C. longispica*
- QQ. Calyx 25-40 mm. long.
- X. Upper lip of the corolla nearly as long as the corolla tube; corolla 25-50 mm. long. (See KK.)
- XX. Upper lip of the corolla about $\frac{1}{2}$ as long as the corolla tube; corolla about 25 mm. long. E. *C. pilifera*
- PP. Bracts of the inflorescence all entire. E. *C. cusickii*

ORTHOCARPUS (OWL CLOVER)

Flowers solitary in the axils, or in a terminal bracted spike; lower lip of the corolla 3-lobed, 1-3-saccate. Stamens 4, 2 shorter; anther cells unlike, the outer attached by its middle, the inner hanging by its end. Capsule oblong. — (Gk. *orthos* = erect, *karpos* = a fruit.)

- A. Leaves entire or merely 3-lobed or -segmented.
- B. Corolla white; lower lip purple-spotted, with 3 conspicuous teeth or lobes; leaves 5-8 cm. long. W. *O. attenuatus*
- BB. Corolla yellow or rose or purple; lower lip entire or with 3 very short teeth.
- C. Corolla white or yellow; leaves 2.5-5 cm. long.
- D. Plant pubescent or hirsute; stem usually simple; corolla pubescent outside.
- E. Calyx teeth acute; corolla yellow, its lower lip about as long as the upper. E. *O. luteus*
- EE. Calyx teeth subulate; corolla white or cream-colored, its lower lip much longer than the upper. E. *O. hispidus*
- DD. Plant merely puberulent; stem usually with spreading branches above; corolla glabrous. E. *O. tolmiei*
- CC. Corolla purple or rose-colored.
- F. Bracts of the inflorescence not colored, all 3-cleft. W. C. E. *O. bracteosus*
- FF. Bracts of the inflorescence red or purple, entire or with 2 smaller lateral lobes.
- G. Leaves 5-8 cm. long, entire or 3-segmented; bracts purple, ciliate at base; calyx 8-12 mm. long; corolla 25 mm. long; capsule ovate. U. *O. cuspidatus*
- GG. Leaves 2.5-5 cm. long, all entire; bracts dull-red, glabrous; calyx 4 mm. long; corolla 8-16 mm. long; capsule obovoid. W. C. *O. imbricatus*
- AA. Leaves or some of them more than 3-lobed or -segmented.
- H. Corolla 4-6 mm. long, purplish. W. *O. pusillus* (RED ANT-WEED)
- HH. Corolla 10-16 mm. long.
- I. Corolla purplish; bracts very different from the leaves.
- J. Tip of upper lip of corolla hooked, puberulent; bracts obtuse. E. *O. tenuifolius*
- JJ. Tip of upper lip of corolla straight, not hooked, glandular-pubescent; bracts acute. E. *O. barbatus*
- II. Corolla white or yellowish; bracts not markedly different from the leaves.
- K. Perennial; lower lip of corolla 1-saccate; bracts somewhat whitish or yellowish at the tip. C. *O. pilosus*
- KK. Annual; lower lip of corolla 3-saccate; bracts not different in color from the leaves. E. *O. lacerus*
- HHH. Corolla 20-28 mm. long.
- L. Bracts with white or yellow or crimson or purple tips.
- M. Bracts white or yellow at least at tips; corolla dull-white or purplish tipped, its upper lip glabrous; filaments glabrous. W. *O. castilleoides*
- MM. Bracts crimson or purple at least at tips; corolla crimson or purple, its upper lip bearded on the back; filaments pubescent. W. *O. purpurascens* (PURPLE OWL CLOVER)
- LL. Bracts with tips uncolored.
- N. Stem much branched; calyx 10-12 mm. long; its teeth lanceolate, about $\frac{1}{2}$ as long as the tube; corolla yellow; anthers 1-celled. W. *O. erianthera*
- NN. Stem simple or with a few branches above; calyx 4 mm. long; its teeth subulate, about as long as the tube; corolla cream-colored or pale-rose; anthers 2-celled. U. *O. lithospermoides*

ADENOSTEGIA

Annual. Leaves narrow, entire to dissected. Flowers in terminal leafy-bracted spikes or fascicles. Sepals apparently 2. Corolla purple or yellow. Stamens 4, 2 shorter or antherless or not present; anther cells either pilose-ciliate or with the base and apex minutely bearded, unlike, outer attached by its middle, inner hanging by its end. — (Gk. *adenos* = a gland, *stegia* = a sheath; floral leaves and bracts are tipped with glands.)

- A. Plant not viscid-glandular; upper calyx lobe 2-toothed or emarginate.
- B. Corolla purplish; anther-bearing stamens 2, rudimentary stamens 2; anthers 1-celled; capsule 8-seeded. C. E. A. capitata
- BB. Corolla yellow; anther-bearing stamens 4; anthers 2-celled; capsule 20-seeded. A. ramosa
- E. A. viscida
- AA. Plant viscid-glandular; upper calyx lobe acuminate. U.

PEDICULARIS (LOUSEWORT)

Flowers in terminal spikes or racemes. Calyx tubular. Corolla strongly 2-lipped; tube cylindric; upper lip laterally compressed; lower lip erect or ascending, 3-lobed; lobes of lower lip spreading or reflexed, middle one smallest. Stamens 4, 2 shorter. Seeds many. — (L. *pediculus* = a louse; it was thought these plants caused lice in sheep.)

- A. Stem leaves alternate or opposite.
- B. Leaves doubly crenulate; corolla whitish or yellowish. W. C. E. P. racemosa (ELEPHANT TRUNK)
- BB. Leaves or some of them pinnately parted.
- C. Corolla whitish or yellowish.
- D. Basal leaves none. U. P. howellii
- DD. Basal leaves present.
- E. Leaf lobes linear; calyx 8–10 mm. long; corolla beak slender, inrolled. C. E. P. contorta (ELEPHANT TRUNK)
- EE. Leaf lobes lanceolate; calyx about 18 mm. long, corolla beak wide, hood-like. W. C. E. P. bracteosa
- CC. Corolla scarlet or purple.
- F. Corolla beaked.
- G. Stems leafy; corolla beak long, threadlike. W. C. E. P. groenlandica (BUTTERFLY TONGUE)
- GG. Stems scapose or with 1 pair of leaves; corolla beak short, conic. C. E. P. ornithorhyncha (BIRD BEAK)
- FF. Corolla beakless.
- H. Plant glabrous; stems branching; calyx 2-cleft; corolla purplish, 12 mm. long. W. C. P. parviflora
- HH. Plant pubescent or glabrate; stems simple; calyx 5-toothed; corolla scarlet, 25–37 mm. long. U. C. P. densiflora (SCARLET LOUSEWORT)
- AA. Stem leaves in whorls or nearly so. W. P. menziesii

OROBANCHACEAE (BROOM-RAPE FAMILY)

Herbs, erect, low, *root parasites*, white or yellow or brown or purple, *without green*; stem simple. Leaves scalelike, alternate. Flowers perfect, irregular. Calyx various. *Corolla 2-lipped, 5-lobed*. *Stamens 4*, 2 shorter, on the corolla tube, alternate with corolla lobes. Ovary superior, 1-celled; *style slender*. Capsule 2-valved. Seeds many.

A. Plant glandular-pubescent; inflorescence often not conelike; upper lip of corolla 2-lobed.

B. Peduncles 2.5-20 cm. long, naked.

THALESIA (p. 209)

BB. Peduncles 0-2 cm. long, often with bracteoles at base of calyx or farther down.

OROBANCHE (p. 209)

AA. Plant glabrous; inflorescence conelike; upper lip of corolla entire.

BOSCHNIAKIA (p. 209)

THALESIA (CANCER-ROOT)

Leaves scattered. Flowers on long bractless scapelike peduncles. Calyx nearly equally 5-cleft. Corolla long, curved, slightly 2-lipped; lower lip 3-lobed. Anther sacs mucronate at base. — (Honor of the Greek philosopher Thales.)

A. Flowers 1-4; calyx lobes subulate, acuminate, longer than the tube. W. C. E.

T. uniflora

AA. Flowers 3-20; calyx lobes triangular, acute, shorter than the tube. W. C. E.

T. fasciculata

BOSCHNIAKIA

Parasitic on plants of the family Ericaceae. Leaves densely crowded. Flowers sessile or short-pedicelled. Calyx shorter at the back, with 3 teeth in front. Corolla swollen at base on 1 side; lower lip 3-lobed or -toothed. Anther sacs blunt at base. — (Honor of some Russian, a Mr. Boschniak.)

A. Calyx with 2 hairlike bracteoles at base; calyx teeth subulate; corolla lips nearly equal; placentae 4. W.

B. strobilacea

AA. Calyx without bracteoles; calyx teeth triangular, blunt; lower corolla lip $\frac{1}{2}$ as long as the upper; placentae 2. W.

B. hookeri

OROBANCHE (BROOM-RAPE)

Leaves scattered. Flowers in spikes or racemes. Calyx unequally 5-toothed. Corolla strongly 2-lipped; lower lip 3-lobed. Anther sacs usually mucronate at base. — (Gk. *orobos* = a vetch, *agchone* = a strangler; thought injurious to vetches.)

A. Calyx lobes plainly longer than the tube.

B. Pedicels 5-16 mm. long; stem simple or branched.

C. Stem 5-10 cm. high; anthers woolly. W. E.

O. comosa

CC. Stem 20-30 cm. high; anthers glabrous or slightly hairy. E.

O. californica

- BB. Pedicels 0-3 mm. long; stem simple. E. O. ludoviciana
 AA. Calyx lobes equaling or shorter than the tubes; stem branched above; flowers
 nearly sessile. E. O. pinorum

PINGUICULACEAE (BLADDERWORT FAMILY)

Herbs, in water or on damp soil. Flowers perfect; pedicels bracteolate. Calyx 2-5-parted. Corolla spurred at base, 2-lipped; upper lip plicate, entire or 2-lobed; lower lip larger, 3-lobed, with a palate. Stamens 2. Ovary superior, ovoid or globose, 1-celled; style short or none; stigma 2-lobed. Fruit a capsule. Seeds many.

- A. Terrestrial plants; leaves entire; flowers purple-violet. W. C. E. — (*L. pin-guis* = fat; the leaves have a fatty feel.) Pinguicula vulgaris (BUTTERWORT)
 AA. Aquatic or marsh plants; leaves dissected or apparently none; flowers yellow. UTRICULARIA (p. 210)

UTRICULARIA (BLADDERWORT)

Free-floating or mud-anchoring. Leaves finely divided in nearly all, sometimes apparently none, bladder-bearing in most water species, with a few mud-covered bladders or none in mud species. Flowers yellow, conspicuous, elevated above the water, very rare.

- A. Leaf segments terete, their margins entire.
 B. Leaves 12-25 mm. long, 2-3-pinnately segmented, very bladdery; bladders 3-4 mm. long. W. C. E. U. vulgaris
 BB. Leaves 4-8 mm. long, several times forked, with few or no bladders; bladders 1-2 mm. long.
 C. Corolla spur short, obtuse. W. C. U. minor
 CC. Corolla spur conic, acute. C. U. occidentalis
 AA. Leaf segments flat, their margins minutely bristle-toothed; leaves 6-12 mm. long, repeatedly forked; bladders nearly always on leafless branches. C. E. U. intermedia

PLANTAGINACEAE (PLANTAIN FAMILY)

Herbs, acaulescent. Leaves basal. Flowers small, perfect or imperfect, in spikes or heads; clusters terminal, on scapes. Calyx 4-parted, persistent. Corolla scarious or membranous, 4-lobed. Stamens 2 or 4, on the corolla. Ovary superior, 1-4-celled; style 1. Fruit a capsule, opening by a lid. Seeds 1 to several. — Only the following genus.

PLANTAGO (PLANTAIN)

Flowers greenish or purplish. — (The Latin name.)

- A. Leaves ovate. W. C. E. P. major (COMMON PLANTAIN)
 AA. Leaves lanceolate.
 B. Seeds 1-2, flat or concave on the face.

- C. Scape glabrous or slightly hairy above. W. C. E. *P. lanceolata* (ENGLISH PLANTAIN)
- CC. Scape densely woolly above. W. *P. macrocarpa*
- BB. Seeds 4-5, plump, neither flat nor concave on the face. E. *P. eriopoda*
- AAA. Leaves linear.
- D. Capsule 2-seeded.
- E. Leaves fleshy; seashore plant. W. *P. maritima* (SEASIDE PLANTAIN)
- EE. Leaves not fleshy; not particularly seashore plants.
- F. Bracts $\frac{1}{4}$ - $1\frac{1}{4}$ as long as the calyx, not aristate.
- G. Scape densely woolly; bracts about as long as calyx. W. C. E. *P. purshii*
- GG. Scape glabrous to pubescent; bracts about $\frac{1}{4}$ as long as the calyx. U. *P. tetrantha*
- FF. Bracts 2-8 times as long as the calyx, aristate.
- H. Spikes dense; plant dark green; bracts 5-10 times as long as the calyx. W. *P. aristata*
- HH. Spike interrupted; plant light green; bracts about twice as long as the calyx. E. *P. spinulosa*
- DD. Capsule 4-seeded.
- I. Plant usually glabrous; leaves linear; corolla-lobes remaining open in the capsule; spike dense; capsule 3-4 mm. long. W. *P. bigelovii*
- II. Plant ashy-puberulent; leaves linear-spatulate; corolla lobes closing over the capsule; spike not dense; capsule 2 mm. long. C. E. *P. elongata*

RUBIACEAE (MADDER FAMILY)

Herbs, annual or perennial. *Leaves* simple, *opposite or whorled*, 1-5-veined from the base. *Flowers* perfect, regular. *Calyx* 4-toothed, or limbless and thus apparently none. *Corolla* funnel-form to rotate, 4-lobed. *Stamens* as many as corolla lobes and alternate with them, on the corolla. *Ovary inferior*, 2-celled; styles 1-2. *Fruit* a capsule or berry or drupe; 2-lobed or -parted. *Seeds* 1 to many.

A. Leaves opposite; stipules small, scarious. W. C. E. — (Honor of A. Kellogg, an American botanist.) *Kelloggia galioides*

AA. Leaves whorled or occasionally some of them opposite; stipules none.

GALIUM (p. 211)

GALIUM (BEDSTRAW)

Stem 4-angled. *Calyx*-limb none or minutely toothed. *Corolla* rotate. *Styles* 2. *Fruit* of 2 somewhat spherical halves, dry or fleshy, smooth to bristly; separating into 2 indehiscent carpels. — (*L. gala* = milk; some species were used to curdle milk.)

A. Leaves 2-4 in a whorl but never all in 2's, 1-5-veined from the base.

B. Leaves 3-5-veined from the base.

C. Fruit hispid with hooked hairs; leaves 12-37 mm. long; leaf margin ciliate; flowers yellowish green. W. C. *G. kamtschaticum* (NORTHERN WILD LICORICE)

CC. Fruit either smooth or hispid with hooked hairs; leaves 25-63 mm. long; leaf margin ciliate or not; flowers clear white. W. C. E.

G. boreale (NORTHERN BEDSTRAW)

- CCC. Fruit hispid with straight hairs; leaves 8-16 mm. long; leaf margin not ciliate; flowers yellowish green. E. *G. multiflorum*
- BB. Leaves 1-veined from the base.
- D. Annual; leaves 2-4 in a whorl, if 4 then 2 of them only $\frac{1}{2}$ as long as the other 2; fruit minutely hispid with hooked bristles. U. C. E. *G. bifolium* (TWIN-LEAVED BEDSTRAW)
- DD. Perennial; leaves 4 in a whorl, all 4 about equal; fruit smooth.
- E. Leaves flat, linear or oblong or wider, not densely crowded; plant 3-12 dm. high, diffuse or climbing.
- F. Plant 7-12 dm. high; leaves obtuse, often mucronate. U. *G. nuttallii*
- FF. Plant 3-6 dm. high; leaves acute, not mucronate. U. C. *G. bolanderi*
- EE. Leaves awl-shaped, angular, densely crowded; plant 0.5-2.5 cm. high, depressed, caespitose. U. *G. andrewsii*
- AA. Leaves 4-6 in a whorl but never all in 4's, 1-veined from the base; perennial.
- G. Leaves acute to rounded, 4-6 in a whorl; fruit smooth.
- H. Flowers 1-3 on peduncles which are solitary in the leaf axils. W. C. E. *G. trifidum* (SMALL BEDSTRAW)
- HH. Flowers in cymes, numerous. W. *G. cymosum*
- GG. Leaves acuminate or cuspidate, 6 in a whorl; fruit minutely or plainly stiff-hairy.
- I. Fruit covered with hooked hairs; leaves 1-2.5 cm. long. W. C. E. *G. triflorum* (FRAGRANT BEDSTRAW)
- II. Fruit rough or minutely hairy but not with hooked hairs; leaves 2.5-5 cm. long. E. *G. asperrium*
- AAA. Leaves 6-8 in a whorl but never all in 6's, 1-veined from the base; fruit covered with hooked bristles; annual.
- J. Stems erect or ascending; fruit 2-3 mm. wide; leaves 1-2.5 cm. long. E. *G. vaillantii*
- JJ. Stems reclining; fruit 4-6 mm. wide; leaves 2.5-7 cm. long. W. E. *G. aparine* (CLEAVERS)

CAPRIFOLIACEAE (HONEYSUCKLE FAMILY)

Herbs or shrubs or trees, perennial, vining to erect. *Leaves opposite*, simple or pinnately odd-compound, pinnately or palmately veined. Flowers perfect. Calyx entire or 5-toothed, sometimes apparently none through complete adherence to the ovary. Corolla rotate to tubular, 5-lobed, sometimes 2-lipped. *Stamens 4-5, on the corolla tube*, alternate with the lobes. *Ovary inferior*, 1-6-celled. Fruit a berry or drupe or capsule.

- A. Leaves pinnately compound; tall shrubs or trees; fruit berrylike, black or red or yellow, 3-5-seeded. *SAMBUCUS* (p. 213)
- AA. Leaves simple.
- B. Leaves palmately 3-5-veined; fruit drupelike, red or black, 1-seeded; tall shrubs. *VIBURNUM* (p. 213)
- BB. Leaves pinnately veined; fruit dry or berrylike.
- C. Leaves coriaceous, evergreen, blade not over 2 cm. long; fruit dry, 1-seeded; shrubby herb, prostrate, vinelike, creeping. W. C. E. — (Honor of C. von Linnaeus the great Swedish botanist.) *Linnaea americana* (TWIN-FLOWER)

CC. Leaves not coriaceous, not evergreen, blade usually larger; fruit berrylike, 2-4-seeded; plainly a shrub or tree, vine to erect, often climbing or reclining.

D. Corolla regular, 12 mm. or less long; ovary 4-celled; berry white, 2-seeded; leaves entire or dentate or irregularly lobed, not united at base; shrub, erect or rarely trailing. **SYMPHORICARPOS** (p. 213)

DD. Corolla irregular, 12 mm. or more long; ovary 2-3-celled; berry red or black, 2-4-seeded; leaves entire or merely sinuate, upper pair sometimes united at base; shrubs or trees, erect or often trailing or a climbing vine.

LONICERA (p. 214)

SAMBUCUS (ELDER)

Leaflets serrate to lacinate. Flowers small, white or pinkish, in cymes. Corolla rotate, regular. Stamens 5, on base of corolla. Ovary 3-5-celled; style 3-parted. — (Gk. *sambuke* = a musical instrument; said to have been made of Elder.)

A. Inflorescence flat-topped; pith in 1-year-old stems white or slightly brownish; berries black but gray with a bloom. W. C. E. **S. glauca** (TREE ELDER)

AA. Inflorescence conic; pith in 1-year-old stems yellowish brown. — Both these have edible fruits.

B. Fruit black, without a bloom; leaves blackening in drying. C. E.

S. melanocarpa (BLACK ELDER)

BB. Fruit bright red to yellow; leaves not blackening in drying. W. C. E.

S. callicarpa (RED ELDER)

VIBURNUM (ARROWWOOD)

Flowers white or pink, in compound cymes, the outer flowers sometimes raylike and neutral. Calyx limb short. Corolla rotate or short-campanulate, regular. Stamens 5. Ovary 1-3-celled; style 3-lobed or -parted. — (Said to be from L. *viere* = to tie; because the twigs of some are very pliable.)

A. Leaves or some of them 3-lobed; fruit red, its stone not or hardly grooved on either face.

B. Erect shrub; cyme 6-10 cm. wide, its outer flowers much larger than the others. W. C. **V. opulus** (HIGH-BUSH CRANBERRY)

BB. Straggling shrub; cyme 1-3 cm. wide, its outer flowers not larger than the others. C. E. **V. pauciflorum** (SQUASH BERRY)

AA. Leaves not lobed, merely dentate above the middle; fruit black, its stone grooved on both faces; cyme 4-10 cm. wide, its outer flowers not larger than the others. W. C. E. **V. ellipticum** (BLACK HAW)

SYMPHORICARPOS (SNOWBERRY)

Flowers 2-bracteolate, white or rose colored. Calyx tube spherical. Corolla short-campanulate to salverform. Stamens 5, on the corolla throat. Berry globose, white. — (Gk. *syn* = together, *phero* = I bear, *karpos* = fruit; from the clustered berries.)

A. Corolla 2-4 mm. long.

B. Erect; leaves glabrous. W. C. E.

S. racemosus

- BB. Trailing; leaves pubescent. W. C. E. S. mollis
 AA. Corolla 6-12 mm. long.
 C. Corolla tube 2-3 times as long as its lobes; leaves tomentulose or pubescent.
 C. E. S. rotundifolius
 CC. Corolla tube 4-5 times as long as its lobes; leaves glabrous or sparsely hairy.
 E. S. oreophilus

LONICERA (HONEYSUCKLE)

Shrubs or small trees, erect to climbing. Flowers in spikes or heads or pairs. Calyx tube ovoid or nearly spherical; limb none or slightly 5-toothed. Corolla tubular to campanulate, either oblique or 2-lipped. Stamens 5. — (Honor of A. Lonitzer, a German botanist.)

- A. Climbing or twining or trailing, vinelike; flowers in terminal clusters; upper pair of leaves united at base.
 B. Flowers orange to scarlet; young stem glabrous.
 C. Corolla 25-40 mm. long, its tube many times as long as its lower lip; leaf margin usually ciliate. W. C. E. L. ciliosa (ORANGE HONEYSUCKLE)
 CC. Corolla 12-16 mm. long, its tube less than twice as long as its lower lip; leaf margin not ciliate. U. L. californica (CALIFORNIA HONEYSUCKLE)
 BB. Flowers pink; young stem hairy. W. L. hispidula (PINK HONEYSUCKLE)
 AA. Erect, the branches sometimes long and reclining on other shrubs; flowers in pairs on axillary peduncles; upper pairs of leaves not united.
 D. Pair of flowers or fruits subtended by narrow or minute bracts, or bractless.
 E. Leaves green on both sides; fruit red.
 F. Corolla whitish, its lobes nearly equal; leaves obtuse. W. C. E. L. utahensis (RED TWIN-BERRY)
 FF. Corolla dark purple, 2-lipped; leaves acute or acuminate. C. E. L. conjugialis
 EE. Leaves somewhat pale beneath; fruit blue-black; corolla yellowish, 2-lipped.
 C. L. coerulea (EDIBLE TWIN-BERRY)
 DD. Pair of flowers or fruits subtended by large wide leaflike bracts; flowers yellow; fruit black. W. C. E. L. involucrata (BLACK TWIN-BERRY)

VALERIANACEAE (VALERIAN FAMILY)

Herbs. Leaves opposite; stipules none. Flowers usually small, perfect or dioecious, clustered. Calyx limb inconspicuous or none in the flower, often becoming prominent in fruit. Corolla somewhat irregular, 5-lobed. Stamens 3, on the corolla, alternate with corolla-lobes, usually exserted. *Ovary inferior*, 1-3-celled; style 1. *Fruit dry*, indehiscent. *Seed 1.*

- A. Annual; calyx teeth not plumose; fruit 3-celled; leaves entire to dentate; flowers white or pink or blue. VALERIANELLA (p. 215)
 AA. Perennial; calyx teeth plumose; fruit 1-celled; leaves entire to compound; flowers white or pink or yellowish. VALERIANA (p. 215)

VALERIANELLA (CORN SALAD)

Basal leaves tufted, entire; stem leaves sessile often dentate. Flowers perfect. Calyx limb short or none. Corolla nearly regular. — (Diminutive of *Valeriana*, a related genus.)

- A. Stems not dichotomous; corolla white or pink; leaf margin not ciliate.
- B. Corolla 6–7 mm. long, rose color, the spur half as long as the tube or less; fruit strongly keeled on the back, broadly winged. W. C. E. *V. congesta*
- BB. Corolla 1–3 mm. long.
- C. Spur of the corolla about as long as the tube; fruit obscurely keeled on the back.
- D. Wing of the fruit wide, as long as the fruit body. E. *V. macrocera*
- DD. Wing of the fruit narrow, shorter than the body. E. *V. mamillata*
- CC. Spur of the corolla none or about half as long as the tube; fruit strongly keeled on the back.
- E. Corolla spurred.
- F. Fruit wingless. W. C. E. *V. samolifolia*
- FF. Fruit winged. U. E. *V. aphanoptera*
- EE. Corolla spurless; fruit winged. W. C. E. *V. anomala*
- AA. Stems dichotomous; corolla pale blue; upper leaves ciliate at margin. W. *V. olitoria*

VALERIANA (VALERIAN)

Flowers perfect or dioecious or the two mixed. Calyx teeth deciduous, inrolled and hidden when in bloom. Corolla tube cylindric to obconic, not spurred. — (Said to be from *L. valere* = to be strong; on account of the medicinal properties of *V. officinalis*.)

- A. Leaflets of the stem leaves coarsely dentate, ovate-lanceolate to orbicular; flowers 6–8 mm. long; plant from a creeping rhizome. W. C. E. *V. sitchensis*
- AA. Leaflets of the stem leaves entire or the terminal one merely 3-cleft.
- B. Corolla 4–8 mm. long, its tube less than twice as long as its limb.
- C. Basal leaves mostly of 3–5 leaflets; divisions of the stem leaves ovate-lanceolate to orbicular; plant from a creeping rhizome. (See A.)
- CC. Basal leaves mostly simple and entire; divisions of the stem leaves linear to lanceolate.
- D. Leaves thick, entire or the segments not dentate, veins somewhat parallel; stems from an erect fusiform rhizome-root. E. *V. ceratophylla* (TOBACCO ROOT)
- DD. Leaves thin, entire or the segments dentate, veins reticulate; stems from horizontal rhizomes. C. *V. sylvatica* (WOOD VALERIAN)
- BB. Corolla 14–15 mm. long, its tube twice as long as its limb. E. *V. columbiana*

DIPSACACEAE (TEASEL FAMILY)

Herbs, biennial, rough-hairy or prickly. *Leaves opposite; stipules none. Flowers* perfect, lilac, in dense involucrate spiny heads, subtended by bracts and involucels; receptacle elongated or globose. Calyx limb cup-shaped, 4-toothed. Corolla 2-lipped, 4-lobed. Stamens 4 on corolla tube, alternate with the lobes; anthers versatile. *Ovary inferior*, 1-celled; style filiform. Fruit

an akene, crowned with the persistent calyx lobes. W. E. — (Gk. *dipsen* = to thirst; because the leaf bases of some catch water.)

Dipsacus sylvestris (Teasel)

CUCURBITACEAE (SQUASH FAMILY)

Herbs, vines, with tendrils, perennial. Leaves alternate, petioled, palmately lobed; stipules none. Flowers racemose, monoecious, white. Calyx limb campanulate, usually 5-lobed. Corolla rotate; limb deeply 5-lobed. Stamens 3, monadelphous. Style 1, terminal. Fruit fleshy, becoming dry, prickly, dehiscent at the summit; Seeds, few, flat. W. E. — (Gk. echinos = a hedgehog, kystis = a bladder; referring to the prickly inflated fruit.)

Echinocystis oregana (WILD CUCUMBER)

CAMPANULACEAE (BELLFLOWER FAMILY)

Herbs. Leaves alternate, simple; stipules none. Flowers regular, solitary-axillary or racemose, white or blue or violet. Calyx 3-5-lobed. Corolla sympetalous, 5-lobed, rotate to campanulate. Stamens 5, usually free from the corolla. Ovary inferior; style 1. Fruit a capsule, prismatic or terete, 2-5-celled. Seeds many, small.

A. Stem leaves lanceolate or spatulate to linear, petioled or sessile, not clasping.

B. Calyx lobes not over 1 cm. long; perennial; leaves sessile or petioled.

CAMPANULA (p. 216)

BB. Calyx lobes 2-4 cm. long; annual; leaves sessile. W. E. — (*Githago* is another genus; Gk. *opsis* = like.)

Githopsis specularioides

AA. Stem leaves ovate to orbicular, sessile, clasping; annual.

C. Calyx lobes triangular-lanceolate, entire; corolla rotate; capsule opening by lateral pores; seed lens-shaped. W. E. — (*L. speculum* = a mirror; referring to the corolla of a European species.)

Specularia perfoliata (VENUS' LOOKING-GLASS)

CC. Calyx lobes triangular-ovate, somewhat toothed; corolla open-campanulate; capsule bursting irregularly; seed obscurely 3-angled. E. — (Gk. *heteros* = different, *kodon* = a bell; referring to the 2 forms of flowers.)

Heterocodon rariflorum

CAMPANULA (BELLFLOWER)

Flowers white or blue or violet. Calyx tube hemispheric to prismatic. Corolla campanulate. Ovary 3-5-celled; stigma 3-5-lobed. Capsule crowned by the persistent calyx lobes. — (Diminutive of *L. campana* = a bell; referring to the corolla.)

A. Stem leaves ovate to lanceolate; corolla lobes spreading; style long-exserted.

B. Stems not clustered; leaves acuminate; pedicel longer than the flower. W. C. E.

C. scouleri

BB. Stems clustered; leaves acute; pedicel shorter than the flower. U.

C. *prenanthoides*

AA. Stem leaves linear or spatulate or cuneate; corolla lobes erect; style included.

C. Plant puberulent; leaves all entire; basal-leaves spatulate; stem leaves mostly linear. C. E.

C. *scabrella*

CC. Plant glabrous; at least the basal leaves not entire.

D. Stem leaves spatulate-oblongate, dentate; basal leaves similar in form to the stem leaves. W.

C. *piperi*

DD. Stem leaves linear, entire; basal leaves orbicular to cordate. W. C. E.

C. *rotundifolia* (BLUEBELL)

LOBELIACEAE (LOBELIA FAMILY)

Herbs, often with milky or acrid juice. *Leaves alternate, simple; stipules none.* Flowers perfect, parts in 5's, racemose or solitary-axillary. Calyx 1-lobed. *Corolla-limb 2-lipped.* Anthers and rarely the filaments united about the style. *Ovary inferior or $\frac{1}{2}$ inferior, 1-2-celled; style 1; stigma with a rim of hairs.* Seed small.

A. Plants merely of wet places, not aquatic; flowers blue.

B. Leaves wavy-denticulate or some of them entire; capsule free from the calyx at its top; corolla cleft to the base on one side.

LOBELIA (p. 217)

BB. Leaves all entire; capsule wholly inferior.

C. Calyx tube oblong or shorter; capsule short; stems creeping or diffuse, rooting at the nodes; corolla without white or yellow center. E. — (Honor of M. A. Laurenti, an Italian botanist.)

Laurentia carnulosa

CC. Calyx tube 10 or more times as long as wide; capsule 2-7 cm. long; stems diffuse or erect, not rooting at the nodes; corolla deep blue with white or yellow center.

DOWNINGIA (p. 217)

AA. Plants aquatic; submerged leaves linear-setaceous or terete.

D. Submerged leaves 2-5 cm. long, all in a basal tuft; perennial; corolla blue.

LOBELIA (p. 217)

DD. Submerged leaves 5-15 cm. long, scattered along an elongated stem; annual; corolla white. W. — (Honor of J. and T. Howell, Oregon botanists.)

Howellia aquatica

LOBELIA (LOBELIA)

Perennial. Leaves alternate or all basal, simple. Flowers blue, in racemes, bracted. Corolla divided to base on 1 side. Stamens free from corolla, monadelphous at least above; 2 or 5 of the anthers with a tuft of hair at tip. Seeds many. — (Honor of M. de l'Obel, a Flemish botanist.)

A. Aquatic; leaves all basal, terete, hollow. W. L. *dortmanna* (WATER LOBELIA)

AA. Terrestrial; most of the leaves scattered along the stem, flat, linear to spatulate.

E.

L. *kalmii*

DOWNINGIA

Annual, glabrous. Leaves sessile. Flowers solitary-axillary, sessile, deep blue with white or yellow center. Corolla tube not split; large lip

3-lobed; small lip 2-lobed. Filaments and anthers united into a tube; 2 anthers with a tuft of hair at tip. Seeds many. — (Honor of A. J. Downing, an American horticulturist.)

A. Leaves acute, lanceolate to ovate; 2 lobes of the smaller lip of the corolla lanceolate. **E.** **D. elegans**

AA. Leaves mostly obtuse, lanceolate to linear; 2 lobes of the smaller lip of the corolla ovate-oblong. **U. E.** **D. pulchella**

COMPOSITACEAE (COMPOSITE FAMILY)

Herbs or shrubs. Leaves various in form and arrangement. *Flowers in heads*, often of 2 kinds, their parts in 4's or 5's; *heads involucrate*. *Calyx limb* none or cuplike, or of teeth or scales or awns or capillary bristles, *often serving as a means of seed dispersal*. Corolla on the calyx, tubular or strap-shaped, or else the inner tubular (disk flowers) and the outer strap-shaped (ray flowers). Stamens as many as corolla lobes, alternate with them, on the corolla tube; *anthers syngenesious*. Ovary 1-celled, ovule 1; style 1; *stigmas 2 in fertile flowers*. *Fruit an akene*. — A difficult family. Keys mostly to genera only. (F. & R. pp. 372-430.)

SCIENTIFIC KEY TO THE TRIBES. (See also p. 219.)

A. Corollas all tubular and regular, or only the marginal ones ligulate.

B. Heads rayless or radiate; anther not tailed at base; style branches either truncate or tipped with an appendage.

C. Heads rayless; flowers never yellow, all perfect; style branches clavate.

EUPATOREAE (p. 220)

CC. Heads usually radiate, very rarely both rayless and yellow; style branches rarely clavate.

D. Style branches of the perfect flowers either flat or tipped with a distinct appendage; leaves mostly alternate. **ASTEREAE** (p. 221)

DD. Style branches of the perfect flowers truncate or appendaged, but not flattened; leaves often opposite.

E. Involucre not scarious.

F. Pappus none or not capillary.

G. Receptacle chaffy. **HELIANTHEAE** (p. 224)

GG. Receptacle not chaffy except in *Gaillardia*. **HELENEAE** (p. 228)

FF. Pappus capillary; receptacle not chaffy. **SENECEAE** (p. 232)

EE. Involucre scarious; pappus none or not capillary; receptacle not chaffy except in *Anthemis* and *Achillea*. **ANTHEMEAE** (p. 230)

BB. Heads rayless (except *Inula*); anthers tailed at base; style branches neither truncate nor tipped with an appendage.

H. Corollas not deeply cleft; receptacle not bristly (except *Evax*).

INULEAE (p. 223)

HH. Corollas deeply cleft; receptacle bristly. **CYNAREAE** (p. 235)

AA. Corollas all ligulate, all perfect. **CICHOREAE** (p. 236)

ARTIFICIAL KEY TO THE TRIBES. (See also p. 218.)

- A.** Herbs.
- B.** Flowers either all tubular or the outer ligulate and the inner tubular; juice rarely milky.
- C.** Pappus of capillary or plumose bristles.
- D.** Heads radiate.
- E.** Rays yellow.
- F.** Heads 3-10 cm. wide; basal leaves 2-5 dm. long, 1-2 dm. wide, oblong, denticulate. **INULEAE** (p. 223)
- FF.** Heads less than 2 cm. wide; leaves smaller.
- G.** Involucre bracts in more than 2 series. **ASTEREAE** (p. 221)
- GG.** Involucre bracts in 1-2 series.
- H.** Rays 20-30 or more. **ASTEREAE** (p. 221)
- HH.** Rays fewer. **SENECEAE** (p. 232)
- EE.** Rays not yellow.
- I.** Flowers appearing before the foliage leaves; staminate and pistillate flowers on separate plants; foliage leaves large, palmately lobed, all basal. **SENECEAE** (p. 232)
- II.** Flowers on foliage-bearing stems, or appearing after the leaves when they are all basal; leaves not as above. **ASTEREAE** (p. 221)
- DD.** Heads rayless.
- J.** Heads distinctly yellow.
- K.** Involucre bracts white, many, almost hiding the few small yellow flowers, the most prominent feature of the head. **INULEAE** (p. 223)
- KK.** Involucre bracts either not white, or not the most prominent feature of the head.
- L.** Corolla deeply 5-lobed. **CYNAREAE** (p. 235)
- LL.** Corolla with 4-5 merely triangular teeth.
- M.** Involucre bracts in more than 2 series. **ASTEREAE** (p. 221)
- MM.** Involucre bracts in 1-2 series.
- N.** Akenes not ribbed, flattish, 0-4 lateral veins. **ASTEREAE** (p. 221)
- NN.** Akenes 5-15-ribbed. **SENECEAE** (p. 232)
- JJ.** Heads not yellow; corolla often hidden in white wool or so inconspicuous that it shows little if any color.
- O.** Leaves large, palmately lobed, squash-leaf-like. **SENECEAE** (p. 232)
- OO.** Leaves pinnately veined.
- P.** Corolla deeply lobed. **CYNAREAE** (p. 235)
- PP.** Corolla with 4-5 merely triangular teeth.
- Q.** Leaves white-woolly at least beneath. **INULEAE** (p. 223)
- QQ.** Leaves not white-woolly.
- R.** Akenes 5-15-ribbed or striate. **EUPATOREAE** (p. 220)
- RR.** Akenes flattish, 0-4-veined. **ASTEREAE** (p. 221)
- CC.** Pappus none, or of scales, or of rigid bristles.
- S.** Heads radiate.
- T.** Rays yellow.
- U.** Receptacle chaffy.
- V.** Leaves in most species opposite at least below; involucre not scarious **HELIANTHEAE** (p. 224)

- VV. Leaves alternate; involucre scarious. **ANTHEMEAE** (p. 230)
- UU. Receptacle not chaffy.
- W. Leaves opposite. **HELENEAE** (p. 228)
- WW. Leaves alternate.
- X. Involucre gummy, not glandular-hairy, glabrous. **ASTEREAE** (p. 221)
- XX. Involucre not gummy, or merely with glandular hairs if sticky.
- Y. Herbage resinous, glabrous. **ASTEREAE** (p. 221)
- YY. Herbage not resinous, mostly not glabrous. **HELENEAE** (p. 228)
- TT. Rays not yellow.
- Z. Involucre bracts scarious or scarious-margined.
- a. Leaves pinnately dissected or compounded. **ANTHEMEAE** (p. 230)
- aa. Leaves entire. **ASTEREAE** (p. 221)
- ZZ. Involucre bracts herbaceous throughout.
- b. Leaves all basal. **ASTEREAE** (p. 221)
- bb. Leaves not all basal. **HELIANTHEAE** (p. 224)
- SS. Heads rayless.
- c. Involucre gummy but not glabrous; flowers yellow. **ASTEREAE** (p. 221)
- cc. Involucre not gummy or merely glandular-hairy if sticky.
- d. Corolla deeply lobed; flowers rarely yellow. **CYNAREAE** (p. 235)
- dd. Corolla with 4-5 merely triangular teeth.
- e. Receptacle chaffy or hairy.
- f. Plants pubescent with jointed hairs. **HELENEAE** (p. 228)
- ff. Plants without jointed hairs. **HELIANTHEAE** (p. 224)
- ee. Receptacle neither chaffy nor hairy.
- g. Heads distinctly white; at least the inflorescence very glandular.
- INULEAE** (p. 223)
- gg. Heads yellowish or brownish or purplish; plant usually not glandular.
- h. Salt-marsh plants. **ANTHEMEAE** (p. 230)
- hh. Not salt-marsh plants.
- i. Involucre bracts scarious at least at margin.
- j. Leaves entire. **INULEAE** (p. 223)
- jj. Leaves not entire. **ANTHEMEAE** (p. 230)
- ii. Involucre bracts not scarious though sometimes burlike.
- HELENEAE** (p. 228)
- BB. Flowers all ligulate; juice milky in most. **CICHOREAE** (p. 236)
- AA. Shrubs.
- k. Leaves glabrous or pubescent but not hoary.
- l. Flowers white or pinkish. **EUPATOREAE** (p. 220)
- ll. Flowers yellow. **ASTEREAE** (p. 221)
- kk. Leaves hoary with white or woolly hairs.
- m. Pappus of capillary bristles.
- n. Involucre of 4-6 bracts. **SENECEAE** (p. 232)
- nn. Involucre of more than 6 bracts. **ASTEREAE** (p. 221)
- mm. Pappus none. **ANTHEMEAE** (p. 230)

EUPATOREAE (Boneset Tribe).—Perennial. Leaves entire to dentate. Heads rayless, all alike, 10-15-flowered; receptacle naked, flat. Flowers perfect, fertile; corolla tubular, regular, 5-toothed, never yellow.

Anthers without tails at base. Style branches somewhat club-shaped, obtuse. Pappus bristles capillary, in 1 series, scabrous to almost plumose.

A. Akenes 5-angled, without intermediate ridges or lines; involucre bracts nearly veinless. **E.** — (Honor of Mithridates Eupator, king of Pontus, who first used one of these in medicine.) **Eupatorium occidentale** (BONESET)

AA. Akenes 10-ribbed or -striate; involucre bracts striate-veined. — (Gk. *koleos* = a sheath, *anthos* = a flower; probably referring to the involucre.)

Coleosanthus (THOROUGHWORT)

ASTEREAE (Aster Tribe). — Leaves mostly alternate. Heads radiate or rayless, all alike (except staminate and pistillate on separate plants in *Baccharis*); receptacle naked. Ray flowers pistillate or rarely neutral. Corolla of disk flowers nearly always yellow, regular, tubular, 4-5-lobed; style branches flat, appendaged. Anthers not tailed at base. Pappus none or various, in most species of capillary bristles.

A. Rays none or very inconspicuous.

B. Herbs though sometimes woody at base; hairy or glabrous, not usually sticky; heads all alike.

C. Pappus of 2-8 rigid awns; involucre glabrous and shining but very gummy.

GRINDELIA (p. 223)

CC. Pappus of scabrous capillary bristles; involucre often glandular but then not glabrous.

D. Involucre bracts in 2-6 vertical rows. — (Gk. *chrysos* = gold, *thamnos* = a shrub; shrubby plants with yellow flowers.) **Chrysothamnus** (RABBIT BRUSH)

DD. Involucre bracts not in vertical rows.

E. Leaves all entire.

F. Heads only 1 on a stem.

G. Involucre glandular; plant 15-30 cm. high, white-tomentose. (See **T.**)

Aplopappus

GG. Involucre hairy, not glandular; plant 5-15 cm. high, white-puberulent to glabrous. (See **QQ.**)

Erigeron (FLEABANE)

FF. Heads more than 1 on a stem.

H. Plant white-tomentose; involucre glandular. (See **T.**)

Aplopappus

HH. Plant not tomentose; involucre rarely glandular.

I. Involucre bracts recurved at tip. (See **Y.**)

Aster (ASTER)

II. Involucre bracts appressed or erect, not recurved.

J. Involucre bracts in 1-3 whorls, herbaceous; annual or biennial. (See **QQ.**)

Erigeron (FLEABANE)

JJ. Involucre bracts in 3 or more whorls, scarious, often with green tips, thin or firm; perennial.

K. Leaves oblong; plant viscid-pubescent, 1.5-3 dm. high. (See **Q.**)

Chrysopsis (GOLDEN ASTER)

KK. Leaves ovate-lanceolate; plant glabrous or nearly so, not viscid, 6-9 dm. high. (See **Y.**)

Aster (ASTER)

EE. Leaves or at least the lower ones not entire.

L. Teeth of the leaves spinulose-tipped. (See **T.**)

Aplopappus

LL. Teeth of the leaves not spinulose-tipped. (See **Y.**)

Aster (ASTER)

LLL. Leaves or nearly all of them entire.

M. Involucre bracts recurved at tip. (See **QQ.**)

Erigeron (FLEABANE)

MM. Involucre bracts erect or appressed at tip, not recurved. (See **Y.**)

Aster (ASTER)

BB. Shrubs, glabrous but sticky; staminate and pistillate heads on separate plants.

E. — (The name of some shrub dedicated to the god Bacchus.)

Baccharis pilularis (WINE BUSH)

AA. Rays yellow.

N. Pappus of scales or rigid awns.

O. Heads large, 10–25 mm. high, many-flowered; pappus of 2–8 rigid awns; involucre bracts often gummy, often recurved at tip. **GRINDELIA** (p. 223)

OO. Heads small, 4–6 mm. high, 2–20 flowered; pappus of 4–14 scales; involucre bracts not gummy, not recurved at tip. — (Honor of the Gutierrez family of the Spanish nobility.) **Gutierrezia** (BROWN-WEED)

NN. Pappus or most of it of capillary bristles.

P. Pappus of 2 distinctly different whorls, an inner of scabrous capillary bristles, an outer of small scales or bristles.

Q. Involucre bracts in several indistinct whorls, the outer distinctly shorter. — (Gk. *chrysos* = gold, *opsis* = like; referring to the golden yellow flowers.)

Chrysopsis (GOLDEN ASTER)

QQ. Involucre bracts in 1–2 indistinct whorls, all about equal. — (Gk. *er* = spring, *geron* = an old man; some early species are very hoary.)

Erigeron (FLEABANE)

PP. Pappus of a single whorl of bristles or else the whorls alike when more than 1.

R. Involucre bracts not in vertical rows; rays rarely fewer than 5; leaves various; herbs or shrubs.

S. Pappus bristles equal or nearly so; heads 3–12 mm. wide. — (L. *solidare* = to make whole; on account of the reputed vulnerary properties.)

Solidago (GOLDENROD)

SS. Pappus bristles unequal; heads often more than 12 mm. wide.

T. Leaves often not as in **TT** in all characters; involucre hemispheric or widely campanulate; herb or shrub, viscid or not. — (Gk. *aploos* = simple; + pappus; the pappus is not plumose.) **Aplopappus**

TT. Leaves spatulate to filiform, 6–25 mm. long, sessile, entire; involucre narrowly campanulate to oblong; shrub, viscid. E. — *Erica* is a genus of heather. (Gk. *meros* = a part; because the leaves are heather-like.)

Ericameria nana (FALSE HEATHER)

RR. Involucre bracts in 3–4 vertical rows; rays 1–4; leaves narrowly linear or spatulate-linear; shrub. (See **D**.)

Chrysothamnus (RABBIT BRUSH)

AAA. Rays some color other than yellow.

U. Pappus none or of scales or of small hairlike bristles or of stout awnlike bristles, in one whorl.

V. Plant glabrous, 3–18 dm. high; heads many; rays white; pappus of several small scales and 2 small stiff bristles. E. — (Honor of J. Bolton, an English botanist.)

Boltonia occidentalis

VV. Plant puberulent to very hairy, acaulescent to 4 dm. high; heads few in most species; rays various; pappus of ray flowers either none or of more than 2 bristles.

W. Scapes leafless and bractless; leaves obovate or spatulate, entire or obscurely dentate; pappus either none or a ring of minute bristles. W. — Sometimes sown on lawns for beauty. (L. *bellis* = pretty; referring to the flowers.)

Bellis perennis (GARDEN DAISY)

WW. Scapes sometimes leafy below, bracted; leaves spatulate to linear, entire; pappus a ring of stout rough awnlike bristles. E. — (Honor of D. Townsend, an American botanist.)

Townsendia (TOWNSENDIA)

UU. Pappus of many capillary bristles, sometimes in 2 whorls and then the outer sometimes of shorter bristles or of scales.

X. Either involucre bracts or else rays not as below; akenes usually flat.

- Y.** Involucre bracts in more than 2 indistinct whorls; rays unequal, wider than filiform, in 1 whorl; pappus in 1 whorl. — (Gk. *aster* = a star; referring to the radiate heads of most species.) **Aster (ASTER)**
- YY.** Involucre bracts in 1-2 indistinct whorls, usually nearly equal; rays mostly filiform, in 1 or more whorls; pappus in 1-2 whorls, the outer whorl often of scales or shorter bristles. (See QQ.) **Erigeron (FLEABANE)**
- XX.** Involucre bracts white, green-tipped; rays about 5, white; akenes not or hardly flattish. W. — (Gk. *serikos* = silky, *karpōs* = a fruit; referring to the hairy akenes.) **Sericocarpus rigidus (WHITE-TOPPED ASTER)**

GRINDELIA (GUM-WEED)

Herbs, often gummy specially on the involucre, coarse. Leaves alternate; stem leaves sessile to clasping. Ray flowers none or in 1 series; corolla yellow. Disk flowers perfect; corolla yellow. Pappus of 2-8 nearly smooth and easily separating awns or bristles. — (Honor of D. H. Grindel, a Russian botanist.) Sometimes a bad pasture weed.

- A.** Stem leaves widest at their base, acute or acuminate; heads radiate, more than 15 mm. high. W. **G. integrifolia**
- AA.** Stem leaves narrowed at their base, obtuse in most.
- B.** Heads more than 15 mm. high, radiate; plant glabrous or sparingly hirsute. W. **G. oregana**
- BB.** Heads 10-15 mm. high, radiate or rayless; plant glabrous throughout or slightly chaffy. W. C. E. **G. nana**

INULEAE (Elecampane Tribe). — Herbs. Leaves entire (except *Inula*). Heads not radiate (except *Inula*). Involucre usually dry and scarious. Pistillate flowers mostly filiform and truncate. Anthers tailed at base (except *Dimeresia* and *Adenocaulon*). Style branches naked, obtuse to truncate, unappendaged. Pappus none or of capillary bristles.

- A.** Heads less than 2 cm. wide, rayless; basal leaves smaller than in **AA**; leaves often white-woolly.
- B.** Leaves linear to oblong or obovate, not cordate at base, often woolly on both sides.
- C.** Leaves alternate.
- D.** Pappus none, except a few bristles on sterile flowers.
- E.** Style and corolla lateral; plant simple or sparingly branched above, loose-woolly. U. — (Gk. *micros* = small, *pous* = foot; application not clear.)

Micropus californicus

- EE.** Style and corolla terminal; plant branching from the base, appressed-woolly. U. — (Gk. *stylos* = a column, *kline* = a bed; referring to the receptacle.)

Stylocline filaginea

- DD.** Pappus of capillary bristles.

- F.** Involucre bracts many and white throughout, conspicuous and almost hiding the small group of yellow flowers within. W. C. E. — (Gk. *a* = not, *knaphalon* = a lock of wool; because the heads are chaffy rather than woolly.)

Anaphalis margaritacea (PEARLY EVERLASTING)

- FF.** Involucre bracts either few or not white throughout, not so conspicuous as the group of flowers within.

- G.** Heads dioecious or sometimes the 2 kinds on the same plant; pappus bristles of the staminate flowers swollen at tip. — (The pappus bristles of the sterile flowers suggested the antennae of insects.) **Antennaria (EVERLASTING)**

GG. Heads all alike, of both pistillate and perfect flowers; pappus bristles not swollen at tip. — (Gk. *gnaphalon* = a lock of wool; referring to the heads.)

Gnaphalium (CUDWEED)

CC. Most of the leaves opposite.

H. Pappus none or of capillary bristles; heads many-flowered; involucre bracts several to many.

I. Receptacle depressed-globose, chaffy; akenes inclosed in involucre bracts. — (Gk. *psilos* = naked, *carphos* = a small dry body; probably because the akenes are naked.) **Psilocarphus**

II. Receptacle columnar, villous; akenes hardly inclosed in involucre bracts.

U. — (Possibly from Gk. *evaxos* = easily broken.) **Evax**

HH. Pappus of stout plumose bristles; heads 2-flowered; involucre bracts 2. **E.**

— (Origin undetermined.) **Dimeresia howellii**

BB. Leaves broadly ovate, cordate at base, glabrous and green above, white-woolly beneath; pappus none. **W. C. E.** — (Gk. *aden* = a gland, *kaulos* = a stem; the stem is very glandular above.) **Adenocaulon bicolor** (SILVER-GREEN)

AA. Heads 3–10 cm. wide, radiate; basal leaves 1–2 dm. wide, 2–5 dm. long; leaves pubescent but not woolly; pappus bristles capillary, rough. **W.** — Medicinal plant. (The Latin name.) **Inula helenium** (ELECAMPANE)

HELIANTHEAE (Sunflower Tribe). — Herbs. Leaves commonly opposite at least below. Heads radiate or rayless; involucre not scarious; receptacle chaffy. Ray flowers yellow or white or pinkish. Disk flowers various in color. Anthers not tailed at base. Style branches of the perfect flowers truncate or tipped with a hairy appendage. Pappus none or never of capillary bristles.

A. Heads radiate, *i.e.*, with some ligulate outer flowers.

B. Rays yellow.

C. Disk flowers dark brown or purple.

D. Upper leaves mostly not dissected, or when some are dissected the plant not glabrous; pappus of 2 to several teeth or awns.

E. Receptacle in fruit conical to columnar, akenes 4-angled, not winged; leaves alternate, entire to pinnatifid. **RUDBECKIA** (p. 226)

EE. Receptacle in fruit flat or convex; akene flat or 4-angled, often somewhat winged; leaves alternate or opposite, entire or merely dentate.

F. Annual; receptacle flat; akene somewhat 4-angled; not at all winged.

HELIANTHUS (p. 227)

FF. Perennial; receptacle convex; akene flat, 1 or both edges somewhat winged. **E.** — (Diminutive of *Helianthus*, a related genus.) **Helianthella**

DD. Upper leaves nearly all of 3 leaflets; plant glabrous throughout; pappus of 2 short teeth. **W. E.** — (Gk. *koris* = a bug, *opsis* = like; referring to the form of the akene.) **Coreopsis atkinsoniana** (TICKSEED)

CC. Disk flowers yellow.

G. Pappus either none or else not of retrorsely-barbed awns.

H. Heads 2.5 cm. or more wide; involucre bracts flat or nearly so, not inclosing a ray akene; leaves often wider than lanceolate.

I. Most of the leaves basal; ray flowers pistillate, fertile.

J. Pappus none; leaves opposite or alternate, in some species pinnately lobed to pinnatifid. **BALSAMORHIZA** (p. 227)

JJ. Pappus a crown of 3–10 teeth, some of which may be awn-tipped; leaves all alternate, mostly entire, never pinnately lobed. **WYETHIA** (p. 227)

- II. Most of the leaves on the stem; ray flowers neutral; pappus of 2-6 deciduous scales or awns. **HELIANTHUS** (p. 227)
- HH. Heads less than 2.5 cm. wide; involucre bracts boat-shaped, more or less inclosing an outer or ray akene; leaves lanceolate or narrower (except *Lagophylla*).
- K. Akenes flattened at right angles to the involucre; involucre bracts keeled on back; plants mostly viscid-glandular; pappus none except in *M. madioides*, of 5-8 scales. — (From *madi*, the name in Chile.) **Madia** (TARWEED)
- KK. Akenes not flattened at right angles to the involucre; involucre bracts rounded or flattish on the back.
- L. Pappus none.
- M. Leaves of the stem pinnatifid; leaves of the branches and fascicles entire, spinulose-tipped; involucre bracts spinulose-tipped; disk flowers 10 or more; ray flowers 10 or more; most of the leaves alternate. — (Gk. *hemi* = half, *zone* = a girdle; the ray akenes are swollen on one side.) **Hemizonia**
- MM. Leaves all entire, not spinulose-tipped; involucre bracts not spinulose-tipped; disk flowers 1-6; ray flowers 4-6.
- N. Disk flowers 1-2, fertile; akenes slightly hairy; plant 2.5-20 cm. high; most of the leaves opposite, 2.5 or less long. W. C. — (Diminutive of *Hemizonia* a related genus.) **Hemizonella durandii**
- NN. Disk flowers 5-6, sterile; akenes smooth; plant 15-75 cm. high; most of the leaves alternate, 5 cm. or less long. E. — (Gk. *lagos* = a rabbit, *phyllon* = a leaf. Application not clear.) **Lagophylla ramosissima**
- LL. Pappus present at least on the disk akenes, of 7-12 scales which are often awn-tipped.
- O. Upper leaves spinulose- or gland-tipped; pappus of 7-12 scales, in 1 whorl, often awn-tipped, its scale portion 3 mm. or less long. (See M.) **Hemizonia**
- OO. Leaves neither spinulose- nor gland-tipped; pappus of about 10 scales, in 2 whorls, not awn-tipped, inner whorl about 6 mm. long. U. — (Gk. *achyron* = chaff, *achaino* = an akene; probably referring to the chaff-like pappus.) **Achyraea mollis**
- GG. Pappus of 2-6 stout retrorsely-barbed awns; heads 0.8-10 cm. wide. **BIDENS** (p. 228)
- BB. Rays white or pink.
- P. Involucre bracts almost flat, not inclosing the ray akenes; leaves narrowly linear, margins involute or revolute; heads 12-30 mm. wide; rays 3-6. E. — (Gk. *blepharon* = an eyelash; + pappus.) **Blepharipappus**
- PP. Involucre bracts boat-shaped, inclosing each an outer or ray akene.
- Q. Heads 12-25 mm. wide; rays 8-13; basal leaves often laciniately lobed or incised. E. — (Meaning not determined.) **Layia glandulosa**
- QQ. Heads 4-12 mm. wide; rays 1-7; leaves all entire or nearly dentate. (See M.) **Hemizonia**
- AA. Heads rayless, *i.e.*, without ligulate flowers.
- R. Pappus none; heads few-flowered; flowers yellow or greenish, the staminate and pistillate often in separate heads; fruit often burlike.
- S. Leaves broadly lanceolate or wider, often lobed or pinnatifid; heads staminate or pistillate or with both kinds of flowers.
- T. Involucre neither tubercled nor spiny; fruit not a bur; staminate and pistillate flowers in the same head; plant merely puberulent or scabrous; lower leaves opposite. E. — (Named from *Ajuga iva*, a plant with a similar odor.) **Iva** (MARSH ELDER)
- TT. Involucre of pistillate heads either tubercled or spiny, making fruit rough or burlike; staminate and pistillate flowers in separate heads; plant either hairy or all the leaves alternate.

U. Involucre bracts of the staminate heads united; fruit often not a bur but when so the bristles usually not hooked.

V. Fruit with 1 whorl of prickles at the top, 1-seeded. **E.**

AMBROSIA (p. 226)

VV. Fruit with prickles in more than 1 whorl or scattered, 1-4-seeded. — (Honor of A. Franseri, a Spanish botanist.) **Franseria** (SAND BUR)

UU. Involucre bracts of the staminate heads distinct; fruit a bur with 20-100 usually hooked bristles. — Persistent field weeds. The burs cling to the wool of sheep, and the tails of horses and cattle. (Gk. *xanthos* = yellow; the Greeks secured a yellow dye from one species.) **Xanthium** (COCKLE BUR)

SS. Leaves linear or linear-lanceolate, entire or remotely serrulate; heads with perfect flowers only; involucre neither tubercled nor spiny. (See **K.**)

Madia (TARWEED)

RR. Pappus of short teeth or barbed awns; heads many-flowered, all alike; flowers yellow or brown or purple, perfect; fruit not burlike.

W. Leaves all alternate; flowers purple or brown; pappus a crown of 2-4 scales.

RUDBECKIA (p. 226)

WW. Leaves opposite, at least below; flowers yellow; pappus of 2-6 retrorsely-barbed awns. **BIDENS** (p. 228)

AMBROSIA (RAGWEED)

Leaves entire to pinnately- or palmately-divided. Heads small, monoecious. Staminate heads in spikes or racemes, in the upper axils and terminal, many-flowered; corolla 5-toothed. Pistillate heads solitary or clustered, in the upper axils, 1-flowered; corolla none. — (Gk. *ambrosia* = food for the gods; quite inappropriate for ours.)

A. Leaves all opposite, entire to coarsely and palmately 3-5-lobed or -cleft; receptacle naked; involucre of the staminate heads 3-4-ribbed; annual. **E.** — A weed.

A. trifida (GREAT RAGWEED)

AA. Some of the leaves often alternate, entire to 1-3-pinnatifid; receptacle chaffy; involucre of the staminate heads not ribbed.

B. Annual; leaves thin, entire to 2-pinnatifid; fruit with acute teeth. **E.** — A bad pasture weed.

A. artemisiaefolia (BITTERWEED)

BB. Perennial; leaves thick, 1-pinnatifid; fruit with blunt teeth or unarmed. **E.**

A. psilostachya (WESTERN RAGWEED)

RUDBECKIA (CONE-FLOWER)

Coarse. Leaves alternate. Heads rayless or radiate, large, on long peduncles, solitary, in the axils or terminal; receptacle conic or convex. Ray flowers yellow or none, neutral. Disk flowers purple or brown, perfect. Pappus none or a crown of 2-4 short teeth. — (Honor of C. Rudbeck, a Swedish botanist.)

A. Rays present.

B. Leaves stiff-hairy; pappus none; disk globose-ovoid. **W.**

R. hirta (BLACK-EYED SUSAN)

BB. Leaves finely soft-hairy; pappus of 4 irregular bractlike teeth; disk columnar.

U.

R. californica (MEXICAN HAT)

AA. Rays none.

C. Plant pubescent; leaves mostly 3-5-parted toward the base. **E.** **R. alpicola**

CC. Plant glabrous or nearly so, somewhat glaucous; leaves entire or dentate. **E.**

R. occidentalis (NIGGER THUMB)

BALSAMORHIZA (BALSAM-ROOT)

Perennial, low, with scapelike or few-leaved stems; roots thick, resinous. Leaves entire to 2-pinnate. Heads radiate, many-flowered, 1-7 on a stem; receptacle flat or barely convex. Disk flowers perfect. — (Gk. *balsamon* = balsam, *rhiza* = root; the root is aromatic.)

- A. Leaves entire to serrate; stems with 1-7 heads.
- B. Ray corolla 2-2.5 cm. long, persistent to the akenes; akenes all canescent. E.
B. *careyana*
- BB. Ray corollas 2.5-5 cm. long, deciduous from the akenes; akenes all glabrous.
- C. Plant silvery-canescant; involucre woolly; stem leaves linear to spatulate. E.
B. *sagittata*
- CC. Plant green, though pubescent to glabrate; involucre not woolly or only so at base; stem-leaves lanceolate. W. E.
B. *deltoides*
- AA. Leaves laciniately lobed to 2-pinnatifid; stems with only 1 head.
- D. Plant green, glabrous or somewhat hairy.
- E. Leaves deltoid in outline, entire to lacinate, not stiff-hairy; involucre more or less woolly, not stiff-hairy. E.
B. *terebinthacea*
- EE. Leaves lanceolate in outline, pinnately-parted or -divided, stiff-hairy; involucre rarely woolly, stiff-hairy. E.
B. *hirsuta*
- DD. Plant canescent or white-tomentose.
- F. Plant canescent with appressed or spreading hairs; leaf divisions linear. W. E.
B. *hookeri*
- FF. Plant densely white-tomentose with often floccose hairs; leaf division oval or oblong. E.
B. *incana*

WYETHIA

Perennial; stems usually simple, from stout root or rhizome. Heads large, 1 to few, all alike; receptacle slightly convex. Ray flowers 2-10 cm. long. Disk flowers 5-toothed. Akenes 4-5-angled. — (Honor of N. J. Wyeth, an American botanist.)

- A. Ray corollas white to pale yellow; leaves oval to broadly lanceolate; stem stiff-hairy. E.
W. *heliathoides*
- AA. Ray corollas bright yellow; leaves oblong-lanceolate to narrowly lanceolate.
- B. Plant sparsely stiff-hairy; involucre very stiff-hairy. W. E. W. *angustifolia*
- BB. Plant smooth and glabrous throughout; involucre glabrous.
- C. Basal leaves oblong-lanceolate, 17-38 cm. long, 7-10 cm. wide; upper stem leaves partly clasping. E. W. *amplexicaulis* (PE-1K)
- CC. Basal leaves lanceolate, 5-15 cm. long, 2-10 cm. wide; upper stem leaves barely sessile and not clasping. E. W. *lanceolata*

HELIANTHUS (SUNFLOWER)

Leaves simple. Heads large; receptacle flat to conic. Ray flowers neutral. Disk flowers yellow or brown or purple, perfect, fertile, 5-lobed. Akene flattish to 4-angled. Pappus of 2 scales or awns, or sometimes with 2-4 additional shorter ones, deciduous. — (Gk. *helios* = the sun, *anthos* = a flower; said to refer to the resemblance.)

- A. Annual; disk flowers brownish or dark purple.
- B. Leaves ovate-lanceolate or wider; rays more than 8; chaff of the receptacle 3-toothed or -cleft, not awnlike at tip; disk often over 12 mm. wide.
- C. Disk about 1.5 cm. wide; leaves oblong to ovate-lanceolate, 2.5-8 cm. long. E. **H. petiolaris** (PRAIRIE SUNFLOWER)
- CC. Disk 2.5 cm. or more wide; at least the lower leaves ovate or cordate, 5-17 cm. long. E. — Often cultivated for beauty or seed.
- BB. Leaves lanceolate to linear-lanceolate; rays 5-8; chaff of the receptacle not 3-toothed, narrowed into awnlike tooth; disk 12 mm. or less wide. U. **H. annuus** (COMMON SUNFLOWER)
- AA. Perennial; disk flowers yellow.
- D. Stems 1.2 m. or less high or long, often not erect; plant scabrous, without hairs; leaves entire or serrulate.
- E. Stems 3-12 dm. high or long; leaves acute or acuminate, entire or serrulate. E. **H. nuttallii**
- EE. Stems 1-3 dm. high or long; leaves obtuse, entire. E. **H. cusickii**
- DD. Stems 1.5-3.5 m. high, erect; plant pubescent or hirsute; leaves coarsely serrate or lobed. W. E. — Cultivated for the tubers for stock. **H. tuberosus** (JERUSALEM ARTICHOKE)

BIDENS (BEGGAR-TICK)

Leaves opposite at least below. Heads radiate or rayless; receptacle flat or nearly so. Pappus of 2-6 teeth or awns; awns retrorsely hispid or barbed. — (*L. bi* = 2, *dens* = a tooth; the akenes of some have 2 barbed teeth.) Weeds. Akenes adhere to wool of animals and to clothing.

- A. Leaves usually 5-divided; plant terrestrial; pappus of 2 awns; akene and awns retrorsely barbed to base; annual. E. **B. vulgata** (5-LEAVED BEGGAR-TICK)
- AA. Leaves serrate to laciniate, or submerged and divided into many capillary segments; pappus of 3-6 awns.
- B. Annual, terrestrial; stem erect; leaves 7-15 cm. long; rays none or not over 16 mm. long; akenes not barbed; pappus awns retrorsely barbed above only. W. E. **B. cernua** (NODDING BEGGAR-TICK)
- BB. Perennial, aquatic; stem slender and not usually erect; leaves 1-5 cm. long; rays 20-25 mm. long; akenes retrorsely barbed at margins; pappus awns retrorsely barbed to base. W. E. **B. beckii** (WATER BEGGAR-TICK)

HELENEAE (Sneezeweed Tribe). — Herbs. Heads radiate or apparently rayless; involucre bracts not scarious; receptacle naked except in *Gaillardia*. Disk flowers fertile, 4-5-toothed, tubular. Anthers not tailed at base. Style branches of perfect flowers truncate or appendaged, not flat. Pappus none or chaffy or awns or bristles but the bristles not capillary.

- A. Leaves opposite, except sometimes the upper.
- B. Leaves entire.
- C. Plants of salt marshes.
- D. Pappus none, involucre bracts not united. W. — (Honor of I. H. Jaume St. Hilaré, a French botanist.) **Jaumea carnosa**
- DD. Pappus of 5-10 chaffy scales; involucre bracts united to form a 5-15-toothed cup. U. — (Honor of Lasthenia, a pupil of Plato.) **Lasthenia glaberrima**
- CC. Plants of dry soil, not of salt marshes.

- E. Involucre bracts flat; receptacle conic to subulate. U. — (Honor of K. E. von Baer, a Russian botanist.) **Baeria aristosa** (GOLD FIELDS)
- EE. Involucre bracts inrolled; receptacle flat. E. — (Gk. *rigios* = stiff; + pappus.) **Rigiopappus leptocladius**
- BB. Leaves palmately 2-5-parted. E. — (Honor of J. F. Bahi, a Spanish botanist.) **Bahia oppositifolia**
- AA. Leaves alternate.
- F. Heads radiate.
- G. Receptacle not chaffy.
- H. Akenes 4-angled; pappus scales blunt or lacerate.
- I. Involucre bracts somewhat united; rays none or present; herbage floccose-woolly. **ERIOPHYLLUM** (p. 229)
- II. Involucre bracts not united; rays none; herbage viscid-pubescent. E. — (Honor of G. W. Hulse, a U. S. army surgeon.) **Hulsea nana**
- HH. Akenes 5-10-ribbed; pappus scales acuminate or aristate.
- J. Involucre bracts erect. E. — (Diminutive of Gk. *aktis* = a ray; probably because the rays are present, though short.) **Actinella richardsoni**
- JJ. Involucre bracts spreading or reflexed. **HELENIUM** (p. 229)
- GG. Receptacle with bristlelike chaff. W. E. — (Honor of Gaillard de Meretonneau, a French botanist.) **Gaillardia aristata**
- FF. Heads rayless.
- K. Involucre bracts with white or purplish tips. E. — (Gk. *hymen* = a membrane; + pappus; because the pappus scales are hyaline.) **Hymenopappus filifolius**
- KK. Involucre bracts green to the tips.
- L. Involucre bracts somewhat united; corollas yellow. **ERIOPHYLLUM** (p. 229)
- LL. Involucre bracts not united; corollas yellow or white or flesh-colored. — (Gk. *chainein* = to yawn, *aktis* = a ray; referring to the dilated marginal corollas.) **Chaenactis**

ERIOPHYLLUM (WOOLLY SUNFLOWER)

Floccose-woolly. Heads many-flowered; involucre green. Ray flowers yellow, or so short that there are practically none. Disk flowers yellow. Pappus of blunt veinless chaffy scales. — (Gk. *erion* = wool, *phyllon* = a leaf.)

- A. Rays 1-3 mm. long. U. **E. stachadifolium**
- AA. Rays 10-20 mm. long.
- B. Akenes glabrous. W. C. E. **E. lanatum**
- BB. Akenes glandular. U. C. E. **E. multiflorum**

HELENIUM (SNEEZEWEED)

Heads many-flowered; involucre herbaceous. All flowers yellow. Akenes hairy on the ribs. Pappus scales 5-6, thin, scarious, acuminate or awn-pointed. — (Said to be in honor of Helen of Troy, who used it cosmetically.)

- A. Leaf blades not decurrent on the stem. E. **H. hoopesii**
- AA. Leaf blades decurrent on the stem.
- B. Leaves dentate; heads several to many. W. C. E. — Poisonous to cattle and sheep. **H. autumnale**
- BB. Leaves entire; head 1. U. **H. bigelovii**

ANTHEMEAE (Sagebrush Tribe).—Herbs or shrubs. Heads rayless or radiate; involucre bracts imbricated, not foliaceous, rarely herbaceous, usually dry and scarious; receptacle naked or somewhat chaffy. Anthers not tailed at base. Style branches of the perfect flowers truncate, sometimes obscurely conic-tipped. Pappus none or chaffy or scalelike or crownlike.

A. Herbs.

B. Rays present.

- C.** Rays 4-6, 4-6 mm. long; receptacle chaffy. W. C. E. — Medicinal plant.
(Honor of Achilles, who first used it as a vulnerary.)

Achillea millefolium (YARROW)

- CC.** Rays 10 or more, 10 mm. or more long.

- D.** Receptacle chaffy, at least toward its tip.

ANTHEMIS (p. 230)

- DD.** Receptacle naked or merely hairy.

- E.** Leaf segments terete or nearly so; receptacle conic. **MATRICARIA** (p. 230)

- EE.** Leaf segments plainly flat; receptacle flat to hemispheric.

CHRYSANTHEMUM (p. 231)

BB. Rays none.

- F.** Heads sessile in the leaf axils or stem forks. U. — (Perhaps *L. solus* = alone, *vagus* = wandering.)

Solvia sessilis

- FF.** Heads peduncled, either terminal on the branches or clustered.

- G.** Salt-marsh plants; leaves fleshy.

COTULA (p. 231)

- GG.** Not salt-marsh plants; leaves not fleshy.

- H.** Heads terminal on the leafy branches; receptacle conic.

MATRICARIA (p. 230)

- HH.** Heads in flat-topped leafless clusters; receptacle flat or hemispheric.

TANACETUM (p. 231)

- HHH.** Heads in bracted spikes or racemes or panicles, not in flat-topped clusters; receptacle flat to hemispheric.

ARTEMISIA (p. 231)

AA. Shrubs.

ARTEMISIA (p. 231)

ANTHEMIS (MAYWEED)

Leaves alternate, pinnatifid or dissected. Involucre bracts scarious-margined. Ray flowers white or yellow. Disk flowers yellow. Pappus none or a mere border. — (The Greek name.)

A. Rays white.

- B.** Leaves glabrous, with bad odor; rays neutral. W. E. **A. cotula** (DOG FENNEL)

- BB.** Leaves pubescent, without bad odor; rays fertile. W. E.

A. arvensis (FIELD MAYWEED)

- AA.** Rays yellow; leaves somewhat tomentose. W. **A. tinctoria** (YELLOW MAYWEED)

MATRICARIA (CAMOMILE)

Herbs, annual. Leaves alternate, 2-3-dissected into narrow or filiform segments. Receptacle naked. Ray flowers white. Disk flowers yellow. Pappus none. — (*L. mater* = mother, *cara* = dear; dear to mothers from reputed medicinal properties.)

A. Heads radiate.

- B.** Rays 20-30; pappus a crown, entire or 4-toothed; akenes obpyramidal, prominently 3-ribbed; herbage nearly odorless. W. E. **M. inodora** (SCENTLESS CAMOMILE)

- BB. Rays 10-20; pappus none; akenes oblong, faintly 3-5-ribbed; herbage sweet-scented. W. E. — Medicinal plant. **M. chamomille** (GARDEN CAMOMILE)
 AA. Heads rayless. W. C. E. **M. suaveolens** (PINEAPPLE WEED)

CHRYSANTHEMUM (CHRYSANTHEMUM)

Perennial. Leaves alternate, incised or dissected. Heads large. Ray flowers white. Disk flowers yellow. — (Gk. *chrysos* = gold, *anthos* = a flower; some species outside our range even have yellow rays.)

- A. Heads 1-2 cm. wide, many, corymbose; rays 10-20, about twice as long as wide; pappus a toothed crown. E. **C. parthenium** (FEVERFEW)
 AA. Heads 2.5-5 cm. wide, few, terminal; rays 20-30, 4 or more times as long as wide; pappus none. W. — A very bad meadow weed.
C. leucanthemum (OX-EYE DAISY)

COTULA

Leaves alternate. Heads many-flowered, with 2 kinds of flowers; receptacle naked. Outer flowers pistillate, in 1-3 rows, apetalous. Inner flowers 4-toothed, yellow, perfect. Pappus none or a mere ring. — (Gk. *kotula* = a small cup, referring to the hollow at the base of the clasping leaves.)

- A. Herbage glabrous or very nearly so. W. **C. coronopifolia** (SALT-MARSH BUTTERHEAD)
 AA. Herbage pubescent. W. **C. australis**

TANACETUM (TANSY)

Perennial, aromatic. Leaves alternate, entire to dissected. Heads with 1 or 2 kinds of flowers; receptacle naked. Pappus none or crownlike. — (Said to be from Gk. *athanatos* = immortal; referring to the durable flowers.)

- A. Leaves 2-5-lobed or parted, but some of the leaves may be entire.
 B. Leaf lobes linear. E. **T. capitatum**
 BB. Leaf lobes not linear or none of the leaves lobed. E. **T. nuttallii**
 AA. Leaves pinnately-parted or -dissected into many segments.
 C. Herbage quite pubescent.
 D. Herbage silky with white hairs; heads many, 6-8 mm. wide. E. **T. potentilloides**
 DD. Herbage villous-pubescent; heads 1-8, 12-16 mm. wide. W. **T. huronense** (SEASHORE TANSY)
 CC. Herbage glabrous or very nearly so; heads many, 6-10 mm. wide. W. — Medicinal plant. **T. vulgare** (GARDEN TANSY)

ARTEMISIA (SAGEBRUSH)

Herbs or shrubs, annual or perennial, bitter, aromatic. Leaves alternate. Heads rayless, small; flowers of 1 or 2 kinds, white or yellowish; receptacle naked or woolly. Outer flowers pistillate and inner perfect, or all perfect. Pappus none. — (Honor of Artemisia, the wife of Mausolus.)

- A. Shrubs.
- B. Plant spiny; akenes with long cobweb-like hairs. E. *A. spinescens* (BUD-BRUSH)
- BB. Plant not spiny; akenes without cobweb-like hairs.
- C. Leaves 3-5-cleft or -parted, the lobes linear; 2-6 dm. high.
- D. Heads usually solitary in the axils of ordinary leaves; panicle spikelike. E. *A. rigida* (SCAB-LAND SAGEBRUSH)
- DD. Heads clustered; panicle thyrsoïd. E. *A. trifida*
- CC. Leaves entire to 3-toothed or -lobed, but the lobes not linear.
- E. Plant 1-3 dm. high; leaves entire to 3-5-lobed, the lobes cuneate, obovate. E. *A. arbuscula*
- EE. Plant 5-20 dm. high; leaves entire to 3-toothed, the teeth triangular. E. *A. tridentata* (COMMON SAGEBRUSH)
- AA. Herbs or merely shrubby at base.
- F. Leaves parted or dissected into oblong or linear segments.
- G. Leaves glabrous or nearly so.
- H. Leaf lobes filiform, entire. E. *A. prescottiana*
- HH. Leaf lobes, wider, laciniate or toothed. E. *A. biennis*
- GG. Leaves pubescent.
- I. Receptacle woolly.
- J. Leaves silvery-pubescent, leaf segments short, filiform. E. *A. frigida* (PASTURE SAGEBRUSH)
- JJ. Leaves not silvery; leaf segments oblong or linear-oblong. E. — Medicinal plant. *A. absinthium* (WORMWOOD)
- II. Receptacle not woolly.
- K. Heads 2-3 mm. wide.
- L. Plants 5-15 cm. high. E. *A. petatifida*
- LL. Plants 30-70 cm. high. E. *A. canadensis*
- KK. Heads 4-5 mm. wide. W. C. E. *A. borealis*
- KKK. Heads 8-10 mm. wide. C. E. *A. longipedunculata*
- GGG. Leaves tomentose, at least on the lower surface.
- M. Involucre glabrous or nearly so. C. E. *A. discolor*
- MM. Involucre densely pubescent or tomentose.
- N. Leaves with scattered fine white-resinous dots. E. *A. atomifera*
- NN. Leaves not resinous dotted. E. *A. ludoviciana*
- FF. Leaves entire to cleft or lobed.
- O. Leaves glabrous or very nearly so on both sides.
- P. Herbage sweet-aromatic; 4-8 dm. high; branches not drooping; heads 30-60-flowered. E. *A. aromatica*
- PP. Herbage not sweet-aromatic; 8-16 dm. high; branches drooping; heads 15-20-flowered. E. *A. dracunculoides*
- OO. Leaves white-tomentose at least beneath.
- Q. Involucre persistently white-tomentose. (See MM.)
- QQ. Involucre glabrous to pubescent but green, not tomentose.
- R. Involucre cylindric; plant 9-15 dm. high. W. *A. heterophylla* (GOLDEN-ROD SAGE)
- RR. Involucre campanulate.
- S. Plant about 10 dm. high; involucre green. W. C. E. *A. tilesii*
- SS. Plant 3-6 dm. high; involucre gray-brown. E. *A. lindleyana*

SENECEAE (Arnica Tribe).—Herbs or shrubs. Heads rayless or radiate; receptacle naked (except sometimes hairy in *Arnica*). Anthers without tails at base though often sagittate. Style branches of perfect

flowers usually truncate or obtuse, without appendages at tip or with short ones. Pappus of capillary bristles but often deciduous; bristles many, smooth to plumose.

A. Herbs.

- B.** Most of the leaves on each plant opposite. — (Said to be from Gk. *arnakis* = a lamb's skin; referring to the softness of the heads.) Some medicinal; many poisonous.

Arnica

BB. Leaves alternate or all basal.

C. Leaves all basal.

- D.** Scapes densely large-bracted; leaves wider than lanceolate, often more than 10 cm. long; flowers white or pinkish. **PETASITES** (p. 233)

- DD.** Scapes naked; leaves linear to oblanceolate, 2.5-10 cm. long; flowers yellow. — (Diminutive of *Raillardia*, a related genus.) **Raillardella**

CC. Some leaves on the stem.

E. Heads radiate.

- F.** Annual; receptacle conic. W. E. — (Gk. *krokis* = the nap or woolliness of cloth; the leaf-axils are hairy.) **Crocidium multicaule**

- FF.** Perennial; receptacle flat. — A large and difficult genus. (L. *senex* = an old man; referring to the hoary heads of some.) **Senecio** (RAGWORT)

EE. Heads rayless.

G. Heads 4-10-flowered.

- H.** Leaves entire, 1-2.5 cm. long; heads about 10-flowered. W. C. E. — (An anagram of *Inula*, another genus of this family.) **Luina hypoleuca**

- HH.** Leaves coarsely dentate, 5-25 cm. long; heads 4-6-flowered. C. — (It was first found on Mt. Rainier.) **Rainiera stricta**

GG. Heads more than 10-flowered.

- I.** Leaves palmately 5-9-lobed or -cleft or -parted, palmately veined. C. E. — (*Cacalia* is a related genus; Gk. *opsis* = like; hence resembling *Cacalia*.)

Cacalopsis nardosmia

- II.** Leaves entire to pinnately compound, not palmately veined. (See **FF**.)

Senecio (RAGWORT)

- AA.** Shrubs. E. — (Gk. *tetradymos* = 4-fold; because many species have just 4 flowers in a head.)

Tetradymia

PETASITES (COLT'S-FOOT)

Perennial; rhizome thick, horizontal. Heads rayless or radiate, in a raceme or corymb, on large bracted stems, appearing before the leaves, dioecious or somewhat so; involucre herbaceous. Pistillate corolla 2-5-toothed. Pappus bristles soft, white, long. — (Gk. *petasos* = a broad-brimmed hat; referring to the leaves.)

- A.** Leaves reniform-orbicular, 1.5-4 dm. wide, 7-11-cleft. W. E. — Petioles cooked and eaten like Rhubarb. **P. speciosus** (LARGE COLT'S-FOOT)

- AA.** Leaves longer than wide, 0.5-2.5 dm. long.

- B.** Leaves broadly sagittate, irregularly dentate to almost entire. E.

P. sagittatus (ARROW-LEAF COLT'S-FOOT)

- BB.** Leaves ovate or oblong, 5-7-lobed; alpine. W. C. E.

P. frigidus (ARCTIC COLT'S-FOOT)

CYNAREAE (Thistle Tribe). — Herbs. Leaves alternate. Heads rayless; involucre much imbricated. Corolla 5-cleft. Anthers tailed at base.

Style unbranched or the branches appendaged. Pappus none or chaff or stiff bristles or capillary bristles, simple or plumose

A. Involucre bracts hooked at tip; leaves not spiny. **ARCTIUM** (p. 234)

AA. Involucre bracts not hooked at tip.

B. Leaves not spiny.

C. Pappus at least partly of plumose bristles.

D. Leaves entire or dentate; heads 1-3 cm. wide. W. C. E. — (Honor of H. B. de Saussure, a Swiss botanist.) **Saussurea americana** (SAW-WORT)

DD. Leaves pinnatifid; heads 5-10 cm. wide. W. — Heads edible. (Gk. *kyon* = a dog; the involucre spines suggest dog-teeth.) **Cynaria scolymus** (ARTICHOKE)

CC. Pappus none or of simple bristles or scales. **CENTAUREA** (p. 235)

BB. Leaves somewhat spiny and often also the involucre.

E. Pappus distinctly plumose.

F. Heads 1-5 cm. wide; involucre bracts not fleshy; akenes not ribbed.

CARDUUS (p. 234)

FF. Heads 5-10 cm. wide; involucre bracts fleshy; akenes slightly ribbed. (See DD.) **Cynaria scolymus** (ARTICHOKE)

EE. Pappus none to barbellate or fimbriate.

G. Heads 6-7 cm. wide; leaves green and blotched with white. W. E. — (Gk. *silybos* = the name of a thistle with edible stem.)

Silybum marianum (LADY'S THISTLE)

GG. Heads 2-4 cm. wide; leaves not white-blotched.

H. Heads not subtended by bristly leaves.

CENTAUREA (p. 235)

HH. Heads subtended by bristly leaves, sessile. U. E. — (Gk. *kniso* = to prick.)

Cnicus benedictus (BLESSED THISTLE)

ARCTIUM (BURDOCK)

Tall, coarse. Leaves broadly ovate, cordate at base, 2-5 dm. long. Heads clustered; receptacle densely bristly. Pappus-bristles short, many, rough, deciduous, in 1 whorl. — (Gk. *arktos* = a bear; from the rough involucre.)

A. Heads racemose, 1.5-3 cm. wide. W.

A. minus (COMMON BURDOCK)

AA. Heads corymbose, 2-5 cm. wide. W.

A. lappa (GREAT BURDOCK)

CARDUUS (THISTLE)

Stout, erect. Heads rayless, all alike (or dioecious in *C. arvensis*). Receptacle flat, densely bristly. Flowers white or red or rarely yellowish. Pappus bristles many, long, in 1 whorl, united into a ring at base. — (The Latin name; said to be from Celtic *ard* = a sharp point.)

A. Perennial by spreading horizontal rootstocks; heads 15-25 mm. high, dioecious. W. E. — One of our worst weeds in cultivated fields. **C. arvensis** (CANADA THISTLE)

AA. Biennial; heads larger, all alike.

B. None of the involucre bracts spine-tipped, all with dilated fringed tips. W. E. **C. americanus**

BB. Outer involucre bracts spine-tipped, inner ones not.

C. Involucre bracts not at all glandular on the back.

D. Involucre bracts either nearly equal or some with spreading herbaceous tips.

E. Flowers cream-colored. W. C. E.

C. remotifolius

- EE. Flowers white to red.
 F. Plant very white-woolly. U. *C. occidentalis*
 FF. Plant densely pubescent to glabrate.
 G. Inner involucre bracts with dilated tips. E. *C. magnificus*
 GG. None of the involucre bracts with dilated tips.
 H. Herbage pubescent, grayish or green; leaves weakly prickly; 10-30 dm. high. W. C. E. — A bad weed in waste places and logged off lands.
C. edulis (EDIBLE THISTLE)
 HH. Herbage glabrate, green; leaves strongly prickly; 6-9 dm. high. E. *C. hallii*
 DD. Involucre bracts much shorter outward, appressed.
 I. Heads oblong or cylindric; inner involucre bracts purplish. E. *C. andersoni*
 II. Heads wider; inner involucre bracts not or very slightly purplish.
 J. Stem somewhat woolly; inner involucre bracts somewhat dilated. E. *C. foliosus*
 JJ. Stem glabrous; inner involucre bracts not dilated. E. *C. drummondii*
 CC. Involucre bracts with glandular ridge or spot on the back.
 K. Outer involucre bracts with spines nearly equaling the body. E. *C. ochrocentrus* (YELLOW-SPINED THISTLE)
 KK. Outer involucre bracts with spines distinctly shorter than the body.
 L. Leaves canescent on both sides. E. *undulatus*
 LL. Leaves green above.
 M. Leaves conspicuously prickly. E. *C. breweri*
 MM. Leaves with few prickles. E. *C. palousensis*
 BB. All the involucre bracts spine-tipped. W. E. — Bad pasture weed.
C. lanceolatus (BULL THISTLE)

CENTAUREA (STAR THISTLE)

Involucre bracts margined or appendaged; receptacle bristly. Marginal flowers sometimes suggesting rays, color various. Pappus none or bristles or scales. — (It is said that the centaur Chiron cured his wounded foot with these.)

- A. Involucre bracts spine-tipped.
 B. Stem not winged; corollas purplish; pappus none. W. *C. calcitrapa* (CALTROPS)
 BB. Stem winged; corollas yellow; pappus of unequal bristles or scales. W. *C. meltensis* (TOCALOTE)
 AA. Involucre bracts not spine-tipped.
 C. Annual; pappus of unequal bristles; corollas white or red or blue or violet. E. *C. cyanus* (BLUE-BOTTLE)
 CC. Perennial; pappus none; corollas red. E. *C. consimilis*

CICHOREAE (Dandelion Tribe). — Herbs, nearly always with milky juice. Leaves alternate, often all basal. Heads involucrate; receptacle flat or nearly so. Flowers all alike, perfect. Corolla strap-shaped, variously colored, truncate but nearly always 5-toothed at apex. Anthers sagittate-auriculate but not caudate at base. Style branches filiform minutely papillose, not appendaged.

- A. Flowers yellow or orange or saffron-colored.
 B. Pappus none; stem leafy, branched; flowers in panicles; akenes 20-30-striate. W. E. — (The Greek name of some plant of the Mustard family.)
Lapsana communis (NIPPLEWORT)

- BB.** Pappus scalelike or of bristles which have a scalelike base; akenes not beaked.
- C.** Pappus of 4-10 scales or bristles, simple or plumose when bristles.
- D.** Pappus of 4-10 bristles, each arising as a continuation of an unforked scalelike or enlarged base; heads erect.
- E.** Annual; heads nodding; involucre bracts all nearly equal except for a few very small ones outside. U. — (Gk. *micros* = small, *seris* = chicory.) **Microseris**
- EE.** Perennial; heads erect; involucre scales gradually shorter in successive whorls. — (Diminutive of *Scorzonera*, a related genus.) **Scorzonella**
- DD.** Pappus of 5 bristles, each arising from the fork of a 2-toothed scalelike base; heads nodding; annual. E. — (Gk. *oura* = a tail; + pappus; because the pappus scales are awned.) **Uropappus linearifolium**
- CC.** Pappus of 15-40 scales or bristles.
- F.** Stems 5-25 cm. high, leafy; pappus bristles plumose, 15-20; leaves entire to pinnatifid; young heads nodding. — Gk. *ptilon* = a feather; *Calais* is an old genus of Compositaceae. **Ptilocalais**
- FF.** Stem none; pappus bristles not plumose, 20-50; leaves entire or wavy; young heads always erect. E. — (Gk. *nothos* = spurious; *Calais* is an old genus of Compositaceae.) **Nothocalais**
- BBB.** Pappus of bristles without a widened scalelike base.
- G.** Bristles of the pappus plumose.
- H.** Bristles of the pappus plumose to near the tip; perennial.
- I.** Leaves stiffly-hairy on both sides; receptacle chaffy; akene long-beaked. W. C. — (Gk. *hypo* = under, *chaeris* = young pigs; because pigs like the roots.) **Hypochaeris radicata** (CAT'S-EAR)
- II.** Leaves glabrous or thinly soft-hairy; receptacle naked; akene beakless or nearly so. W. — (Gk. *leon* = a lion, *odous* = a tooth; referring to the leaf-teeth.) **Leontodon autumnale** (FALL DANDELION)
- HH.** Bristles of the pappus plumose only near the base; akenes beakless; annual. **Malacothrix**
- GG.** Bristles of the pappus not plumose.
- J.** Plants acaulescent; leaves all basal; flowers solitary on leafless bractless unbranched scapes.
- K.** Leaves entire or merely obscurely wavy; scape only 1; heads nodding in bud; mature akene beakless, truncate. (See **EE.**) **Scorzonella**
- KK.** Leaves or some of them lobed or pinnatifid; scapes 1 or more; head erect in bud; mature akene beaked or attenuate.
- L.** Chief involucre-bracts imbricated in one series; akenes spinulose at the apex, long-beaked. W. C. E. — Medicinal plant. Bad lawn weed. (Gk. *taraktikos* = a cathartic; from its medicinal properties.) **Taraxacum officinale** (DANDELION)
- LL.** Chief involucre-bracts in several series; akenes smooth at apex, attenuate or long-beaked. — (Gk. *aix* = a goat, *seris* = chicory.) **Agoseris** (GOAT CHICORY)
- JJ.** Plants with evident stems; stems simple or branched, leafy or bracted; flowers 1 or more on a stem.
- M.** Akenes terete or 4-5-angled, not flat.
- N.** Pappus of an inner whorl of bristles, and an outer whorl of short teeth with 0-8 bristles among them, inner whorl deciduous; annual. E. — (Gk. *malache* = soft, *thrix* = hair; referring to the pappus.) **Malacothrix**
- NN.** Pappus of bristles only and no teeth, persistent; annual or perennial.
- O.** Pappus white; akenes somewhat narrowed at tip; leaves entire to dandelion-like in their lobing. **CREPIS** (p. 238)
- OO.** Pappus tawny or in a few almost white; akenes rarely narrowed at tip; leaves entire to shallowly toothed but not dandelion-like. **HIERACTIUM** (p. 238)

- MM.** Akenes somewhat flat.
P. Akenes beakless, truncate; heads 50-flowered or more. **SONCHUS** (p. 237)
PP. Akenes beaked or attenuate; heads 6-30-flowered. **LACTUCA** (p. 238)
- AA.** Flowers white or pink or blue or purple; stems leafy or bracted.
Q. Pappus a crown of short blunt scales; heads sessile or nearly so, in spikes or racemes. *W.* — Root a substitute for coffee. (From *chikouryeh*, its Egyptian name.) **Cichorium intybus** (CHICORY)
QQ. Pappus of simple bristles though often scabrous.
R. Flowers white; leaves and lower part of stem with long white stiff spreading hairs; leaves lanceolate to oblong, entire. **HIERACIUM** (p. 238)
RR. Flowers not white; plant without long white stiff spreading hairs; leaves usually not as described above.
S. Leaves entire, lanceolate or narrower, not sagittate at base; flowers rose-colored or pink; akene terete, neither flat nor angled. *E.* — (Gk. *lygos* = a twig, *desma* = a bundle; referring to the tufted rushlike stems.) **Lygodesmia**
SS. Leaves either not entire or else sagittate at base; flowers pink or blue or purplish; akene terete or 4-5-angled or somewhat flat.
T. Akene terete or 4-5-angled, not flat; pappus tawny; leaves deltoid-hastate but becoming narrower up the stem; plant 3-6 dm. high. *W. C.* — (The Latinized Indian name for the Rattlesnake-root.) **Nabalus hastatus** (RATTLESNAKE ROOT)
TT. Akene somewhat flat; pappus white; leaves several times as long as wide; plant usually taller. **LACTUCA** (p. 238)
- QQQ.** Pappus of plumose bristles.
U. Heads solitary and terminating a leafy stem, 5-10 cm. wide; leaves all entire; akene with long slender beak; flowers purple. *W. E.* — Cultivated as a vegetable for its root. (Gk. *tragos* = a goat, *pogon* = a beard; referring to the conspicuous tawny pappus.) **Tragopogon porrifolia** (OYSTER PLANT)
UU. Heads in panicles or corymbs, 2.5 cm. or less wide; mostly with at least the basal leaves not entire; flowers pink or white.
V. Akene tapering into a slender beak as long as the body; involucre 18-25 mm. high, 15-30-flowered. *E.* — (Probably in honor of C. S. Rafinesque, an American botanist.) **Rafinesquia californica**
VV. Akene truncate, beakless; involucre 6-15 mm. high, 3-6-flowered. *E.* — (Gk. *ptilon* = a feather; referring to the plumose pappus.) **Ptiloria**

SONCHUS (SOW THISTLE)

Stem leafy. Leaves mostly auriculate-clasping, entire to pinnatifid, prickly-margined. Heads in corymbs or panicles; receptacle naked. Corolla yellow. Pappus of bristles; bristles many, white, capillary, simple. — (Gk. *sonchos* = hollow; referring to the stem.)

- A.** Involucre glandular-pubescent, 25 mm. high; flowers bright yellow; perennial; leaves with acute basal angles; akenes transversely wrinkled. *W. E.*
S. arvensis (FIELD SOW THISTLE)
AA. Involucre glabrous, 12-16 mm. high; flowers pale yellow; annual.
B. Leaves with acute basal angles; akenes transversely wrinkled. *W.*
S. oleraceus (COMMON SOW THISTLE)
BB. Leaves with rounded basal angles; akenes not transversely wrinkled. *W. E.*
S. asper (PRICKLY SOW THISTLE)

LACTUCA (LETTUCE)

Stems tall, leafy. Heads in panicles; receptacle naked. Corolla yellow or blue or purple. Pappus-bristles capillary, soft, many. — (*L. lac* = milk; from the abundant milky juice.)

- A. Pappus brownish; flowers blue; plant 1-3.5 m. high; involucre 10-12 mm. long; leaves not prickly on the mid-veins beneath. W. C. E. **L. spicata**
- AA. Pappus white; flowers rarely blue, mostly yellow.
- B. Leaves not prickly on the mid-veins beneath.
- C. Flowers blue; perennial; involucre 16-20 mm. long; akene and its beak about $\frac{1}{2}$ as long as the pappus. W. E. **L. pulchella** (BLUE LETTUCE)
- CC. Flowers yellow, rarely purplish; annual or biennial; involucre 8-14 mm. long; akene and its beak about as long as the pappus.
- D. Heads 12-20-flowered; akenes 1-veined on each face. W. — Cultivated for eating. **L. sativa** (GARDEN LETTUCE)
- DD. Heads 6-12-flowered; akenes several-veined on each face; plant 1-4 m. high.
- E. Leaves strictly entire. E. **L. sagittifolia**
- EE. Leaves except the upper ones sinuate-pinnatifid. E. **L. canadensis** (WILD LETTUCE)
- BB. Leaves prickly on the mid-veins beneath; flowers yellow; akene about equaling its beak. W. E. — A bad weed of waste places. Sometimes called China Lettuce. **L. scariola** (PRICKLY LETTUCE)

CREPIS (HAWK'S-BEARD)

Stems leafy or scapellike. Corolla yellow. Pappus bristles capillary, many, usually soft. — (*Gk. krepis* = a sandal. Application not clear.)

- A. Leaves glabrous, some of them pinnatifid; stem leafy; stem leaves clasping. W. E. **C. virens** (SMOOTH HAWK'S-BEARD)
- AA. Not as above in all points. — Too difficult for beginners.

HIERACIUM (HAWKWEED)

Perennial. Leaves sometimes all basal. Corolla white or yellow. Pappus of capillary bristles, scabrous. — (*Gk. hierax* = a hawk; it was supposed to better the vision of birds of prey.)

- A. Flowers white; involucre not distinctly imbricated. W. C. E. **H. albiflorum** (WHITE HAWKWEED)
- AA. Flowers yellow. — Too difficult for beginners.

GLOSSARY

A-. Not, or without.

Acaulescent. Apparently stemless, the leaf-bearing stem being very short or subterranean.

Acicular. Needle-shaped.

Acuminate. Taper-pointed.

Acute. Merely sharp-pointed, or ending in a point less than a right angle.

Adnate. Grown together.

Akene = Achene. A small, dry, hard, 1-celled, 1-seeded indehiscent fruit.

Alpine. Belonging to high mountains above the limit of forests.

Alternate (leaves, branches). Singly at the stem-nodes.

Ament = Catkin. A deciduous scaly spike of flowers.

Angiosperms. The great group of seed plants with ovules (and seeds) inclosed by an ovary.

Annual. Of only one year's duration.

Anther. The part of the stamen which contains the pollen.

Anthesis. The opening of the flower.

Apetalous. Without petals.

Apiculate. Tipped with a short and abrupt point.

Appressed. Lying close and flat

Arborescent. Treelike in size or form.

Arcuate. Bent or curved like a bow.

Aril. An appendage growing at or about the hilum of a seed.

Aristate = Awned.

Aristulate. Diminutive of aristate.

Articulate = Jointed.

Ascending. Rising gradually upward.

Auricles. Earlike appendages.

Auriculate. With earlike appendages.

Awl-shaped. Sharp-pointed from a broader base.

Awn. A bristle-like appendage.

Awned. With an awn.

Axil. The upper angle between a leaf and the stem.

Axillary. Occurring in an axil.

Axis. The central line of any body; the organ around which others are attached

Barbed. With usually reflexed rigid points or short bristles like the barb of a fishhook.

Barbellate. Finely barbed.

Basifixed. Attached by the base.

Beaked. Ending in a long narrow tip.

Bearded. With long or stiff hairs of any sort; awns of grasses are sometimes called beards.

Berry. A fruit pulpy or juicy throughout, as a currant or a grape.

Bi-. Two or twice.

Bidentate. 2-toothed.

Biennial. Growing from seed one year, then blooming and dying the next.

Bifid. 2-cleft to about the middle.

Bilabiate = Labiate. 2-lipped.

Bipinnate = 2-pinnate. Pinnate, then each part again pinnate.

Bipinnatifid = 2-pinnatifid. Pinnatifid, and then the parts again pinnatifid.

Biternate = 2-ternate. With 3 main divisions each with 3 leaflets.

Bladdery. Thin and inflated.

Bract. A very much reduced leaf, specially one subtending a pedicel.

Bractlet. A bract on the pedicel.

Bristle. A stiff sharp hair or any very slender body of similar appearance.

Bulb. A leaf bud with fleshy scales, usually subterranean.

- Bulbiferous.** Producing bulbs.
- Bulblet.** A small bulb.
- Bulbous.** Bulblike in form.
- Caducous.** Dropping off very early as compared with other parts.
- Caespitose.** Growing in tufts.
- Callus.** A hard protuberance; in grasses the tough swelling at the base of the lemma.
- Calyx.** The outer set of floral envelopes; when there is but 1 it is considered to be calyx.
- Campanulate.** Bell-shaped
- Canescent.** Grayish white with fine hairs.
- Capillary.** Hairlike in form.
- Capitate.** Collected into a headlike cluster; headlike in form.
- Capsule.** A pod; any dry dehiscent seed-vessel.
- Carinate.** Keeled; furnished with a sharp ridge or projection on the lower side.
- Carpel.** The pistil is composed of 1 or more modified leaves, each of which is a carpel.
- Carpous.** Of or like a carpel.
- Caruncle = Strophiole.**
- Catkin = Ament.**
- Caudate.** Tailed.
- Caudex.** The persistent base of an otherwise annual herbaceous stem.
- Caulescent.** Having an obvious leafy stem.
- Cauline.** Belonging to a stem
- Cernuous.** Nodding.
- Chaff.** Small scales or bracts on the receptacle of Compositaceae; the glumes of grasses, etc.
- Chaffy.** Furnished with chaff, or of the texture of chaff.
- Chartaceous.** With the texture of paper or parchment.
- Ciliate.** The edge with a fringe of hairs.
- Cinereous.** The color of ashes.
- Circinate.** Rolled inward from the end, like some umbrella handles.
- Circumscissile.** Opening by a transverse circular line of division.
- Clavate.** Shaped like a baseball bat.
- Claw.** The narrow or stalklike base of some petals.
- Cleft.** Separated by a sharp indentation half way to the mid-vein or base, or less.
- Club-shaped = Clavate.**
- Coalescence.** The union of parts or organs of the same kind.
- Cohesion.** The union of one organ with another of like nature.
- Column.** The united stamens, as in Malvaceae; or the stamens and pistils united into one body, as in Orchidaceae.
- Commissure.** The plane of union of the two carpels in the Umbellaceae.
- Compound.** A pistil composed of 2 or more carpels; a leaf divided into leaflets.
- Compressed.** Flattened on two opposite sides.
- Cone = Strobilus.**
- Congested.** Crowded together.
- Connate.** United or grown together from the first.
- Connective.** The part of the anther connecting its two cells.
- Connivent.** Converging, or brought close together.
- Contorted.** Twisted together.
- Convolute.** Rolled up lengthwise.
- Cordate.** Heart-shaped, with the notch basal.
- Coriaceous.** Leathery in texture.
- Corm.** A solid bulb.
- Corolla.** The flowery envelope (usually showy) within the calyx.
- Corona = Crown.**
- Corymb.** A flat or convex flower cluster, with branches arising at different levels and blooming from the outside toward the center.
- Corymbose.** Corymb-like.
- Costate.** Ribbed.
- Cotyledons.** The first leaves of the embryo.

- Creeping** (stems). Growing flat on or beneath the ground and rooting.
- Crenate**. With rounded teeth.
- Crown**. An appendage at the top of the claw of some petals.
- Crustaceous**. Hard and brittle in texture; crustlike.
- Cucullate**. Hooded or hood-shaped.
- Cuneate** = **Cuneiform** = **Wedge-shaped**.
- Cupule**. A little cup; the cup of the acorn.
- Cuspidate**. Tipped with a sharp and stiff point.
- Cymbiform**. Boat-shaped.
- Cyme**. Like a corymb, but blooming from the center outward.
- Cymose**. Cyme-like.
- Deciduous**. Applied to leaves which fall in autumn, and to a calyx and corolla which falls before fruit forms.
- Decomound**. Several times compounded.
- Decumbent**. Reclined on the ground, but the summit tending to rise.
- Decurrent** (leaves). With bladelike extensions on the stem beneath the insertion, as in thistles.
- Decussate**. In pairs which are successively alternate with each other.
- Deflexed**. Bent downwards.
- Dehiscence**. The natural opening of an anther or pod or other vessel.
- Dehiscent**. Opening naturally.
- Deltoid**. Shaped like the Greek letter Δ.
- Dentate**. Toothed.
- Denticulate**. Diminutive of dentate.
- Depauperate**. Below the natural size.
- Depressed**. Flattened, or as if pressed down from above.
- Di-**. Two, or twice.
- Diadelphous** (stamens). United by the filaments into two sets.
- Dichotomous**. 2-forked.
- Dicotyledonous**. Having 2 cotyledons.
- Dicotyledons**. Plants which have 2 cotyledons.
- Didymous**. Twin.
- Didynamous** (stamens). 2 longer than the others.
- Diffuse**. Spreading widely and irregularly.
- Digitate**. Leaflets all borne on the apex of the petiole.
- Dimorphous**. Of 2 forms.
- Dioecious** = **Dioicous**. With stamens and pistils in separate flowers on different plants.
- Disk**. The central region of a head of flowers, like the sunflower, as opposed to the ray or margin; a fleshy expansion of the receptacle of a flower.
- Dissected**. Cut deeply into many lobes or divisions.
- Distichous**. Two-ranked.
- Diurnal**. Daily; in 24 hours.
- Divaricate**. Very widely divergent.
- Divided** (leaves, etc.). Cut into divisions extending about to the base or the midrib.
- Dorsal**. Pertaining to the back or outer surface of an organ.
- Drupaceous**. Drupelike.
- Drupe**. A stone fruit.
- Drupelet**. Diminutive of drupe.
- Echinate**. Armed with prickles.
- Elliptic** = **Elliptical**. Oval or oblong, with the ends regularly rounded.
- Emarginate**. Shallowly notched at the summit.
- Emerged**. Raised out of water.
- Ensiform**. Sword-shaped.
- Entire** (foliar organs). The margin not at all toothed, notched, or divided.
- Ephemeral**. Lasting for a day or less.
- Epigynous**. Upon the ovary.
- Equitant**. Leaves which infold each other in two ranks, as in *Iris*.
- Erose**. As if gnawed.
- Evergreen**. Holding the leaves over winter or longer until new ones appear.

- Excurrent.** Projecting beyond the apex; or a tree trunk continued to the very top.
- Exserted.** Protruding out of, as the stamens out of the corolla.
- Extrorse.** Turned outward.
- Falcate.** Curved like a hand sickle.
- Fascicle.** A close cluster.
- Fascicled.** Growing in a bundle or tuft.
- Fastigate (branches).** Close, parallel.
- Favose.** Honeycombed.
- Fertile.** Fruit-bearing; or pollen-bearing anthers.
- Filament.** The stalk of a stamen; any slender thread-shaped appendage.
- Filiform.** Thread-shaped.
- Fimbriate.** Fringed.
- Flabelliform.** Fan-shaped.
- Floccose.** Composed of or bearing tufts of woolly or long and soft hairs.
- Foliaceous.** Leaflike.
- Follicle.** A simple pod, opening down the inner suture.
- Foveate.** Deeply pitted.
- Foveolate.** Diminutive of foveate.
- Free.** Not united with any other parts.
- Fringed.** The margin beset with slender appendages, bristles, etc.
- Fruit.** The seed-bearing structure of a plant.
- Fugacious.** Soon falling off or perishing.
- Fulvous.** Tawny; dull yellow with gray.
- Fusiform = Spindle-shaped.**
- Galea.** A hooded or helmet-shaped portion of some perianths.
- Gamopetalous = Monopetalous = Sympetalous.** Petals united into one piece.
- Geminate.** In pairs.
- Geniculate.** Bent abruptly, like a knee.
- Gibbous.** More swollen at one place or on one side than the other.
- Glabrate.** Becoming glabrous with age, or almost glabrous.
- Glabrous.** Smooth, having no hairs, bristles, or other pubescence.
- Gland.** A secreting surface or structure; any protuberance or appendage having the appearance of such an organ.
- Glaucous.** Covered with a fine white powder that rubs off, like that on a fresh plum.
- Globose.** Spherical or nearly so.
- Glochidiate (hairs or bristles).** Barbed; tipped with barbs, or with a double hooked point.
- Glomerate.** Closely aggregated into a dense cluster.
- Glomerule.** A dense headlike cluster.
- Glume.** The chaff of grasses, in this book the outer husks or bracts of each spikelet.
- Gymnosperms.** The great group of seed plants with ovules and seeds not inclosed in an ovary.
- Gynobase.** An enlargement or prolongation of the receptacle bearing the ovary.
- Gynoeceium.** The whole set of pistils.
- Habitat.** Conditions under which a plant grows.
- Hastate.** Like an arrowhead, but with the basal lobes pointing outward nearly at right angles.
- Hemi-. Half.**
- Herb.** A plant with no persistent woody stem above ground.
- Herbaceous.** With the texture of common herbage; not woody nor leathery.
- Hermaphrodite (flower) = Perfect.**
- Heterogamous.** With 2 or more kinds of flowers as to their stamens and pistils.
- Hirsute.** Hairy with stiffish or beard-like hairs.
- Hispid.** Bristly; beset with stiff hairs.

- Hispidulous.** Diminutive of hispid.
- Hoary.** Grayish white.
- Homogamous.** A head or cluster with flowers all of one kind.
- Hooded = Hood-shaped = Cucullate.**
- Hyaline.** Transparent or nearly so.
- Hypogynous.** Inserted under the pistil.
- Imbricate.** Overlapping like shingles on a roof.
- Immersed.** Wholly under water.
- Imperfect (flowers).** Wanting either stamens or pistils.
- Incised.** Cut rather deeply and irregularly.
- Indehiscent.** Not splitting open.
- Indurated.** Hardened.
- Inferior (ovary).** Calyx grown fast to the ovary and thus apparently on it.
- Inflated.** Turgid and bladdery.
- Inflexed.** Bent inward.
- Inflorescence.** The arrangement of flowers on the stem; the flower cluster as a whole.
- Infra-stipular.** Below the stipules at base of petiole.
- Insertion.** The place or the mode of attachment of an organ to its support.
- Internode.** The part of a stem between two nodes.
- Interruptedly pinnate.** Pinnate with small leaflets intermixed with larger ones.
- Introrse.** Turned or facing inward or toward the axis of the flower.
- Involucel.** An involucre of the second order.
- Involucrate.** With an involucre.
- Involucre.** A whorl or set of bracts around a flower or umbel or head.
- Involute.** Rolled inward from the edges.
- Jointed.** Composed of joints, or having joints in it.
- Keel.** A projecting ridge on a surface, like the keel of a boat; the two anterior petals in the Bean Family.
- Labiate = Bilabiate.**
- Laciniate.** Slashed; cut into deep narrow lobes.
- Lanceolate.** Lance-shaped.
- Lax.** The opposite of crowded.
- Leaflet.** One of the divisions or blades of a compound leaf.
- Lemma.** The lower of the two bracts inclosing the flower in the grasses.
- Lenticular.** Lens-shaped, both sides convex.
- Ligulate.** Furnished with a ligule.
- Ligule.** The strap-shaped corolla in many Compositaceae; the little membranous appendage at the summit of the leaf sheaths of most grasses.
- Limb.** The blade of a leaf, petal, etc.
- Linear.** Narrow and flat, the margins parallel.
- Lip.** The principal lobes of a 2-lipped corolla or calyx; the odd and peculiar petal in the Orchidaceae.
- Lobe.** Any projection or division (especially a rounded one) of a leaf, etc., especially when not extending more than halfway to the mid-vein or base.
- Loculicidal (dehiscence).** Splitting down through the middle of the back of each cell.
- Lunate.** Crescent-shaped.
- Lyrate.** Lyre-shaped; an obovate or spatulate pinnatifid leaf with the end lobe large and roundish and the lower lobes small.
- Marcescent.** Withering without falling off.
- Membranous.** With the texture of a membrane; thin and more or less translucent.
- Midrib = Mid-vein.** The middle or main rib of a leaf.
- Monadelphous.** Stamens united by their filaments into one set.

- Monocotyledonous** (embryo). Having only one cotyledon.
- Monocotyledons**. The great group of plants having only 1 cotyledon.
- Monoecious = Monoicous**. With stamens and pistils in separate flowers on the same plant.
- Monopetalous** (flower) = **Gamopetalous**. With united petals.
- Mucronate**. Tipped with an abrupt short point.
- Mucronulate**. Diminutive of mucronate.
- Multi-**. Many.
- Muriculate**. Rough with fine short hard points.
- Nectariferous**. Nectar-bearing.
- Nerve = Vein**.
- Node**. The joints of a stem, from which the leaves arise.
- Nodose**. Knotty or knobby.
- Nut**. A hard and mostly one-seeded indehiscent fruit, as a chestnut, butternut, acorn.
- Nutlet**. Diminutive of nut.
- Ob**. Upside down.
- Obcompressed**. Flattened the opposite of the usual way.
- Obcordate**. Heart-shaped with small end basal.
- Oblanceolate**. Lance-shaped with the tapering point basal.
- Oblong**. Two to three times as long as wide, and more or less elliptic.
- Obovate**. Inversely ovate, the broad end up.
- Obtuse**. Blunt or round at the end.
- Ochroleucous**. Yellowish white; dull cream-color.
- Ocrea**. A sheathing stipule.
- Odd-pinnate**. Pinnate with an uneven number of leaflets.
- Offset**. Short branch next the ground which takes root.
- Opposite**. Applied to leaves and branches when an opposing pair occurs at each node; to stamens when directly in front of the petals.
- Orbicular**. Circular or nearly so in general outline.
- Oval**. Broadly elliptical.
- Ovate**. Shaped like the section of an egg with the broader end basal.
- Ovoid**. A solid with an ovate section.
- Ovule**. The body which becomes a seed after fertilization.
- Palate**. A projection on the lower lip of a 2-lipped corolla closing the throat.
- Palet**. The inner husk of grasses; the chaff or bracts on the receptacle of many Compositaceae.
- Palmate**. Applied to a leaf whose leaflets or divisions or main ribs all spread from the apex of the petiole, like a hand with outspread fingers.
- Palmately lobed, cleft, parted, divided, etc.** The varying depths of division of a palmate leaf.
- Panicle** (inflorescence). An open cluster like a raceme, but more or less compound.
- Panicked = Paniculate**. In panicles, or panicle-like.
- Papilionaceous**. Butterfly-shaped; applied to such a corolla as that of the pea.
- Papilla** (papillae). A little nipple-shaped protuberance.
- Papillose**. Covered with papillae.
- Pappus**. The modified calyx limb in Compositaceae, forming a crown of very various character at the summit of the akene.
- Parietal = Lateral**. Attached to the walls, as of the ovary.
- Parted**. Separated into parts almost to base.
- Pectinate**. Pinnatifid or pinnately divided into narrow and close divisions, like the teeth of a comb.
- Pedicel**. The stalk of each particular flower of a cluster.

- Pediceled.** With a pedicel.
- Peduncle.** A flower stalk, whether of a single flower or of a flower cluster.
- Peduncled.** With a peduncle.
- Peltate.** Shield-shaped; applied to a leaf, whatever its shape, when the petiole arises from the under surface.
- Pendulous.** Somewhat hanging or drooping.
- Penta-** 5.
- Perennial.** Lasting from year to year.
- Perfect (flower).** Having both stamens and pistils.
- Perfoliate.** Applied to a leaf through whose base the stem appears to pass.
- Perianth.** The floral envelopes of the flower, especially when calyx and corolla cannot be distinguished.
- Pericarp.** The wall of the ripened ovary, which in many cases is the wall of the fruit.
- Perigynium.** The inflated sac which incloses the ovary in *Carex*.
- Perigenous (flower).** Sepals and petals and stamens arising from the rim of a tube or cup surrounding the pistil or pistils.
- Persistent.** Remaining beyond the period when such parts commonly fall.
- Petal.** A corolla leaf.
- Petiole.** The leafstalk.
- Petioled = Petiolate.** With a petiole.
- Petiolulate.** With a petiolule.
- Petiolule.** The stalk of a leaflet.
- Pilose.** Hairy with soft slender hairs.
- Pinnate (leaf).** Leaflets along the main axis of the leaf.
- Pinnately lobed, cleft, parted, divided, etc.** The varying depths of division of a pinnately veined leaf.
- Pinnately-veined.** With secondary veins arising from a mid-vein.
- Pinnatifid.** Pinnately cleft.
- Pistil.** The seed-bearing organ of the flower.
- Pitted.** Having small depressions or pits on the surface.
- Placenta.** The surface of the ovary to which the ovules are attached.
- Plicate.** Folded lengthwise into plaits.
- Plumose.** Feathery; when any slender body is beset with hairs.
- Pluri-** Several, or many.
- Pod.** Any sort of capsule.
- Poly-** Many.
- Polygamous.** Having some perfect and some staminate and pistillate flowers on the same or on different individuals.
- Polymorphous.** Of several forms.
- Polypetalous.** With the petals distinct.
- Polysepalous.** When the sepals are distinct.
- Pome.** A fleshy apple-like fruit, *e.g.*, apple, pear, haw.
- Procumbent.** Trailing on the ground.
- Produced.** Extended or projecting farther than usual.
- Proliferous.** A new branch arising from an older one, or one head or cluster of flowers from another.
- Prostrate.** Lying flat on the ground.
- Pruinose.** Covered with a powder resembling hoarfrost.
- Puberulent.** Covered with almost imperceptible fine and short down.
- Pubescence.** Fine and soft hairs.
- Pubescent.** With pubescence.
- Punctate.** Dotted, either with minute holes or apparently so.
- Raceme.** A flower cluster with one-flowered pedicels along the axis of inflorescence.
- Racemose.** Bearing racemes; or raceme-like.
- Rachilla.** The axis of a spikelet.
- Rachis.** An axis bearing close-set organs; specially the axis of a spike.
- Radiate.** Furnished with ray flowers.
- Radical.** Belonging to the root, or apparently coming from the root.
- Ray.** The marginal flower of a head or cluster when different from the

- rest, especially when ligulate; the branch of an umbel.
- Receptacle.** The more or less expanded or produced end of an axis which bears the organs of a flower or the collected flowers of a head.
- Recurved.** Curved outward or backward.
- Reflexed.** Bent outward or backward.
- Regular (flower).** All the parts of each whorl similar.
- Reniform.** Kidney-shaped.
- Repand.** Wavy-margined.
- Retrorse.** Directed back or downward.
- Retuse.** The apex slightly indented.
- Revolute.** Rolled backward, as the margins of many leaves.
- Rhizome = Rootstock.** A subterranean or creeping rootlike stem.
- Rib = Vein.**
- Ringent.** Gaping.
- Rootstock = Rhizome.**
- Rosulate (leaves).** In a rosette, or basal whorl.
- Rotate.** Wheel-shaped.
- Rudimentary.** Imperfectly developed, or in early stage of development.
- Rugose.** Wrinkled, roughened with wrinkles.
- Runcinate.** Coarsely saw-toothed or cut, the pointed teeth turned toward the base of the leaf, as in dandelions.
- Runner.** A slender and prostrate branch rooting at the end or at the joints.
- Sac = Sack.** Any closed membrane, or a deep purse-shaped cavity.
- Saccate.** Sac-shaped.
- Sagittate.** Arrowhead-shaped.
- Salver-shaped = Salverform.** With a border spreading at right angles to a slender tube.
- Samara.** A wing fruit, *e.g.*, maple, ash, elm.
- Scabrous.** Rough or harsh to the touch.
- Scale.** A reduced leaflike body which is not green.
- Scape.** A peduncle rising from the ground, naked or without ordinary foliage.
- Scapose.** Scapelite; or with a scape.
- Scarious.** Thin, dry, membranous, and not green.
- Scorpioid.** Curved or circinate at the end.
- Scurf.** Minute scales on the surface of many leaves.
- Scutellate.** Saucer-shaped.
- Secund.** One-sided, as where flowers, leaves, etc., are all turned to one side.
- Semi-.** Half.
- Sepal.** One of the leaves of which the calyx is composed.
- Septate.** Divided by partitions.
- Septum (septa).** A partition, as of a pod, etc.
- Sericeous.** Clothed with satiny pubescence.
- Serrate.** With margin cut into teeth pointing forward.
- Serrulate.** Diminutive of serrate.
- Sessile.** Without any stalk or petiole.
- Sheath.** A tubular envelope, as the lower part of the leaf in grasses.
- Shrub.** A woody perennial, smaller than a tree, usually with several stems.
- Silique.** The pod of the Cruciferae.
- Silky.** Glossy with a coat of fine and soft, close-pressed, straight hairs.
- Silvery.** Shining white or bluish gray, usually from a silky pubescence.
- Simple.** Of one piece; the opposite of compound.
- Sinuate.** Strongly wavy.
- Sinus.** The cleft or depression between two lobes.
- Spadix.** A fleshy spike.
- Spathe.** A bract which sheaths an inflorescence, specially a spadix.
- Spatulate.** Shaped like a spatula, or druggist's spoon.
- Spicate.** Spikelike; in a spike.

- Spike** (inflorescence). The flowers sessile on an elongated axis.
- Spikelet**. A small or a secondary spike.
- Spindle-shaped**. Tapering at both ends like a sweet potato.
- Spine**. A sharp woody or rigid outgrowth.
- Spinescent**. Tipped by or degenerating into spines or thorns.
- Spinose**. Thorny.
- Spur**. Any projecting appendage of the flower.
- Squarrose**. Said of scales, leaves, etc., when they spread widely from the axis on which they are thickly set.
- Stamen**. The pollen-bearing organ.
- Staminodium** (staminodia). Abortive stamens or other bodies in the position of stamens.
- Standard**. The upper petal of a papilionaceous corolla.
- Stellate**. Starlike; several similar parts radiating from a common center.
- Sterile**. Barren or imperfect.
- Stigma**. The region of the pistil which receives the pollen.
- Stipe**. The stalk-like base of a pistil.
- Stipitate**. Furnished with a stipe.
- Stipules**. The appendages on each side of the base of some leaf petioles.
- Stolon**. Trailing or reclined and rooting shoots.
- Stoloniferous**. Producing stolons.
- Strap-shaped**. Long, flat, and narrow.
- Striate**. Marked with slender longitudinal grooves or channels.
- Strict**. Close and narrow; straight and narrow.
- Strigose**. Beset with appressed, rigid bristles or hairs.
- Strobilus = Strobile = Cone**. A cone-like or headlike fruit, as in hop and pine.
- Strophiole**. An excrescence or appendage at or about the hilum of a seed.
- Style**. The beak-like prolongation of the pistil above the ovary, which bears the stigma.
- Stylopodium**. An enlargement at the base of the style, found in Umbellaceae and some other plants.
- Sub-**. About, nearly, somewhat.
- Subulate**. Awl-shaped.
- Succulent**. Juicy or pulpy.
- Sucker**. A shoot from subterranean branches.
- Suffrutescent**. Slightly shrubby or woody at the base only.
- Superior** (ovary). The ovary free from the calyx to its base.
- Suture**. The line of junction of contiguous parts that seem to have grown together.
- Sympetalous**. With united petals.
- Syngenesious**. With stamens united by their anthers.
- Taproot**. A stout vertical root which continues the main axis of the plant.
- Tawny**. Dull yellowish with a tinge of brown.
- Tendril**. A thread-shaped process used for climbing.
- Terete**. Circular in cross section.
- Ternate**. In 3's.
- Tetra-**. 4.
- Tetradynamous**. With four stamens longer than the other two.
- Thorn = Spine**.
- Throat**. The orifice of a gamopetalous corolla or calyx; the region between the tube proper and the limb.
- Thyrus**. A compact and pyramidal panicle.
- Tomentose**. Clothed with matted woolly hairs.
- Tomentum**. Matted woolly hairs.
- Toothed**. Furnished with teeth of short projections of any sort on the margin; used especially when these are sharp, like saw teeth, but do not point forward.
- Torulose**. Knobby; where a cylindrical body is swollen at intervals.

- Tri-.** 3.
- Trifid.** 3-cleft.
- Trigonous.** 3-angled.
- Triquetrous.** Sharply 3-angled; and specially with the sides concave.
- Truncate.** Ending abruptly, as if cut off transversely.
- Tuber.** A thickened portion of a subterranean stem or branch.
- Tubercle.** A small excrescence.
- Tunicate.** Invested with layers as an onion.
- Turbinate.** Top-shaped.
- Turgid.** Swollen; thick as if swollen.
- Twining.** Ascending by coiling round a support, like the hop.
- Umbel.** The umbrella-like form of inflorescence.
- Umbellate.** In umbels.
- Umbellet.** A secondary or partial umbel.
- Unarmed.** Destitute of spines, prickles, and the like.
- Uncinate.** Hook-shaped; hooked at the end.
- Undulate.** Wavy or wavy-margined.
- Unequally pinnate = Odd-pinnate.**
- Unguiculate.** With a claw or narrow base.
- Uni-.** 1.
- Unisexual.** Having only one kind of sex organs; applied also to flowers having only stamens or pistils.
- Urceolate.** Urn-shaped.
- Utricle.** A small thin-walled one-seeded fruit.
- Valvate.** Opening by valves; in the bud, meeting by the edges without overlapping.
- Valve.** One of the pieces into which a dehiscent pod or any similar body splits.
- Veins.** The fibrovascular strands or ribs of a leaf or other organ.
- Venation.** The veining of leaves, etc.
- Ventral.** Belonging to the anterior or inner face of an organ; the opposite of dorsal.
- Versatile** (anther). Attached near the middle and turning freely on its support.
- Verticillate = Whorled.**
- Vesicle.** A little bladder.
- Villous.** Shaggy with long and soft hairs.
- Vine.** Any trailing or climbing stem.
- Virgate.** Wand-shaped, as a long, straight slender twig.
- Viscid.** Glutinous, sticky.
- Wedge-shaped.** Broad above and tapering by straight lines to a narrow base.
- Whorl.** A circle of leaves or other organs at a node.
- Whorled.** Arranged in a circle.
- Wing.** Any membranous expansion.
- Woolly.** Clothed with long and tangled soft hairs.

INDEX

Family names both common and scientific are in SMALL CAPITALS. Otherwise, scientific names are in roman and common names are in *italics*.

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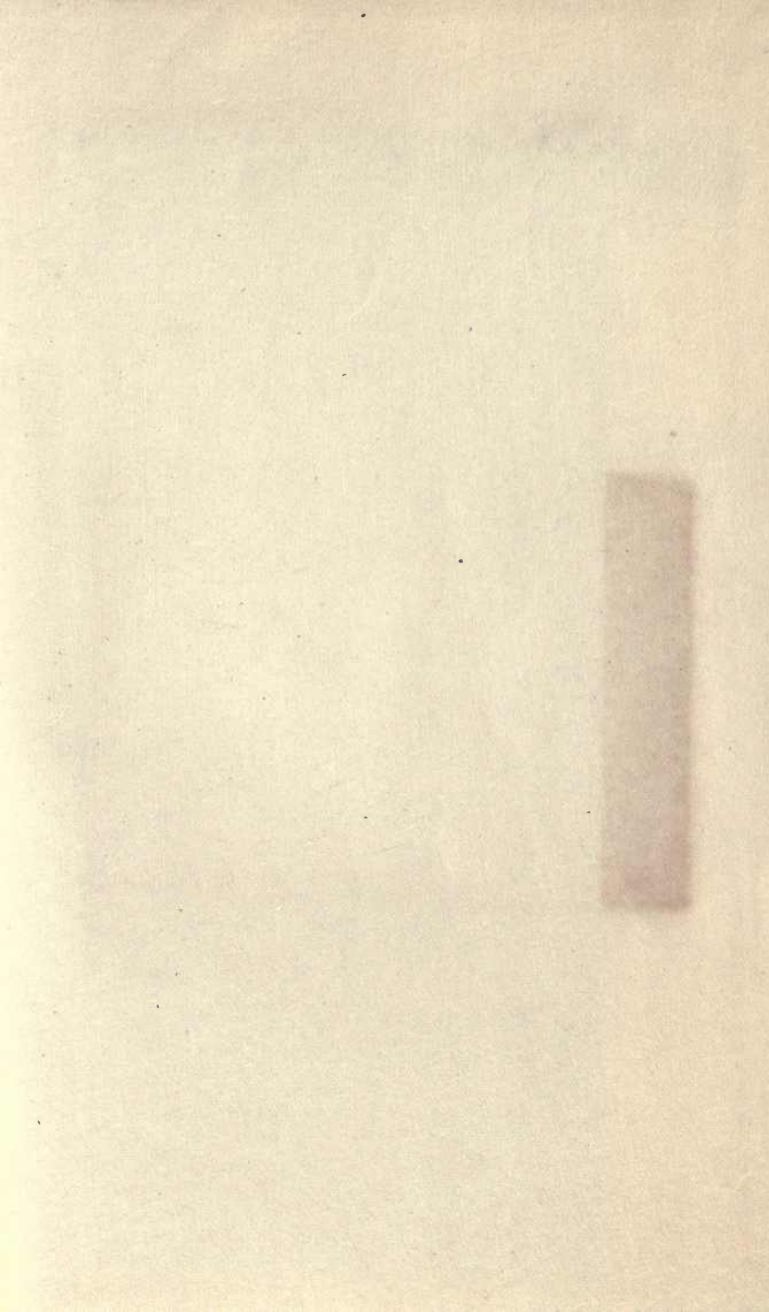
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